

~~X. 205. d.~~





ENCYCLOPÆDIA BRITANNICA;
OR, A
DICTIONARY
OF

ARTS, SCIENCES, &c.

On a PLAN entirely NEW:

By WHICH,

THE DIFFERENT SCIENCES AND ARTS

Are digested into the FORM of Distinct

TREATISES OR SYSTEMS,

COMPREHENDING

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according to the Latest Discoveries and Improvements;

AND FULL EXPLANATIONS GIVEN OF THE

VARIOUS DETACHED PARTS OF KNOWLEDGE,

WHETHER

Relating to NATURAL and ARTIFICIAL Objects, or to Matters ECCLESIASTICAL,
CIVIL, MILITARY, COMMERCIAL, &c.

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AND

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VOL. I.

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MDCCLXXVIII.

DISTONARY

ARTS, SCIENCES, &c.

OF A MAN OF THE NEW

THE DIFFERENT MANERS AND ARTS

THE ARTS OF SYSTEMS

THE HISTORY, THE ARTS, THE SYSTEMS

According to the latest improvements

of the ARTS OF SYSTEMS

VALUABLE ARTS OF KNOWLEDGE



According to the latest improvements

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P R E F A C E.

THE mind of man has been by some authors called a *tabula rasa*, and compared to a sheet of clean paper. But this principle, however generally received, may perhaps admit of some hesitation; especially if it should be found less salutary in its consequences than could be wished. One should imagine, that the human intellect, by its original constitution, easily admits and retains some impressions, as congenial to its nature, and faithful to their objects; whilst it repels others with aversion or disdain, as subversive of its happiness, and false to the things which they represent. Hence our frame, from its very origin, seems marked by the hand of nature with indubitable signatures of pre-eminence and distinction. Hence man assumes the important characters of a rational being and a moral agent. Hence his desires of happiness and truth are insatiable, and his capacities of enjoying them indefinite.

From the feeblest efforts of infancy to the last convulsive struggles of departing life, these grand objects, these irresistible attractions, actuate all his powers, and animate all his enterprises, through every gradation of his progressive being. It must, however, be acknowledged, that, in these sublime pursuits, the mind is obnoxious to error and deception: but still the ends which she proposes are the same, though she may err in selecting the proper means by which alone they can be attained. We may further observe, that though truth and happiness originally appear to the mind in different forms; yet, in nature, they are inseparable: for nothing that is false can be a source of endless and universal happiness; nor can any truth, as truth, be productive of unmixed and permanent misery.

Whether the superior desires and capacities with which our nature is invested necessarily result from the inherent excellence of its powers, or from the advantages of its structure and organization, or from both, we cannot at present stay to inquire. These questions will more properly find their solution in other departments of science. It is sufficient for the purpose which we have now in view, to observe this important fact established, That the original powers of man are susceptible of culture and refinement to a very high degree; and that the proper exertion and application of these faculties are not only conducive, but essential, to his happiness, whether considered as an individual, or a social being. Every attempt, therefore, to enlarge his views, to improve his talents, to direct his efforts, and to form his nature for its sublime destiny, should certainly command the public regard and attention; and the only apology which can be offered for the cold reception too generally given to such laudable endeavours, arises either from their multiplicity, or from their want of merit and consequently of success. It would be at the same time an endless and a fastidious task, to enumerate the various methods by which men of leisure and speculation have essayed to cultivate the public understanding and taste, or to trace literature through all the various forms in which it has tried to gain the general attention.

Abstract truths have, as it were, been clothed with a body, that, by the drapery of narrative and allegory, they might be more effectually recommended to our notice, and more agreeably inculcated. The various topics of art and science have

have been ranged in a systematic order, and volumes professedly written upon each. But the taste for novelty still demanded various gratification. Hence unconnected miscellanies, and detached essays, appeared. But these periodical effusions of genius and learning, that they might be obvious to all capacities, were generally too flimsy and superficial either to attract or deserve the attention of a cultivated mind. To exhibit art and science in all their extent and lustre, it was at last thought necessary to reunite the detached parts in one work, that their proportions, their relations one to another, and to the general system of which they are constituents, might be more clearly and obviously perceived. With this intention, Dictionaries of Arts and Sciences have been compiled; and it is certain, that such a plan, regularly and successfully prosecuted, may be productive of numberless utilities and advantages. But when topics, far from being digested into a system, or disposed in their natural order, are violently dilacerated, and, without any regard to their proper positions, huddled together as the order of the letters which constitute their technical terms determine, such a work should rather be called a book of shreds and patches, than a Dictionary of Arts and Sciences. We do not deny, that every article, as an article, may have considerable merit: but, as it stands connected in nature with what ought to precede or to follow it, we affirm, that it cannot have the same influence upon the mind without its antecedents and consequences; and that an understanding formed upon such models, is rather a chaos of detached and heterogeneous ideas, than a regular intellect. It is only by thinking in method, by reducing our ideas to a proper and natural order, by observing what they possess in common, and what are their relations or differences, that our reasoning faculties are capable of making any progress at all. Without these assistances, we might be ranked amidst sensitive or conscious beings, but could never attain the human or rational character. At the same time, it must be confessed, that there is some inconvenience in being reduced to the necessity of perusing a whole system when we only want to consult a particular topic. To avoid these disagreeable extremes, the compilers of the *Encyclopædia Britannica* have endeavoured to give a compendious, yet clear and satisfactory, account of each particular science or art, under its proper denomination; whilst the subordinate articles in each are likewise explained under their technical terms. Thus the systematic reader will be fully and regularly informed by turning to the general name of the science which he wishes to explore; whilst the person who, already acquainted with the whole, wishes only to consult particular topics, or others who are willing to content themselves with partial and detached views of things, will find them illustrated under the articles by which they are denominated. To be more explicit upon this head: Detached articles may be divided into three kinds. The first consists of such as, independent of particular systems, admit of a full and complete illustration as they stand; the second, of such as require partly to be discussed under the systems to which they belong, and partly under their own proper denominations; the third, of such as are sufficiently elucidated in the systems to which they appertain. Those of the first kind need no references. Those of the second, being only partially explained under their particular denominations, demand references to the systems where the illustrations are completed. For those of the last, as no explication is found necessary under the terms, we refer to the systems of which they

they are constituents, where the subjects are fully discussed. These our readers may consult as emergencies require or their own dispositions impel them.

To accomplish a task so arduous and important, neither labour nor expence has been spared. The best authors on each particular science have been collected, and compared. Such as could be abridged without disadvantage, have been epitomized with all possible care: others who were more concise and tenacious of their subjects, have been more closely pursued, and more faithfully retained. When topics have been obscurely or imperfectly treated, the utmost endeavours have been used to supply these defects; and upon such parts of science as the compilers have not found properly illustrated by other authors, original essays are inserted. Nor do these amount to an inconsiderable number. To each particular art or science, a history of its origin, progress, and revolutions, is prefixed, so far as these can be collected or deduced from historians, or from other authors by whom the subjects are occasionally treated. But where these are defective, careless, or inconsistent, in their narrations; neither can absolute certainty, nor circumstantial accuracy, be expected from us. This task, therefore, demands no small degree of industry and perspicacity, because the various events relative to the discovery or improvement of literature have often been either entirely neglected, or only obscurely hinted, by their contemporary authors. A few instances will show how inauspicious to learning these omissions have proved, and of what importance the discovery of such events must be, not only as they gratify mere unmeaning curiosity, but as they elucidate the particular sciences in which they are found. Every one who has the least acquaintance with navigation, must observe the inestimable utility of the mariners compass; which, by rendering voyages more safe and expeditious, gives a facility and success to the business of commerce, which it could not have attained by any other means. Yet the name of its inventor, the æra and occasion of its discovery, are extremely uncertain: for though, in the year 1260, it was produced as his own invention by Paulus Venetus, it was not applied to the purposes of navigation for a long time afterwards, when it was again exhibited by Gioia of Amalphi, who likewise claimed the discovery as his own. Nothing has more effectually contributed to render knowledge accessible and diffusive than the art of printing: yet the same culpable inattention of authors had left its origin, and the gradations of its improvement, difficult to be investigated. The wonderful powers of magnetism and electricity long remained undiscovered, and longer still unapplied to the purposes of utility. Nor have we, perhaps, at this enlightened period, derived from them all the advantages of which they may be found productive: a consideration which ought incessantly to stimulate our industry in acquiring such improvements as have been already made, or to actuate our inventive powers for enlarging the sphere of discovery.

In the theories of arts we may reasonably hope to find a higher degree of satisfaction. Particular care has therefore been taken to deduce them, with all possible accuracy, in a series of conclusions drawn from intuitive truths, or from principles previously discovered. But wherever such a series has been left interrupted by others, and where it appears impossible from the state of learning to supply that deficiency, we must be forgiven for only exhibiting, as certain, such as have been made; without imposing on the public conjectural for real improve-

ments, which from the former state of learning have seemed, and from its present may still seem, unattainable. Yet, through the whole of this department, wherein such regions of hesitation and conjecture occur, we have not remained silent and supine. A number of probable solutions not commonly met with have been offered to the public attention. In disputed points, arguments and objections have been displayed in their full force; a method which is so far from leading to scepticism, that it not only appears the most efficacious but the only real means of discovering and establishing truth. Thus every reader will see his favourite system attacked and defended in such a manner that his own judgment may determine the victory; and thus, by comparing it with other systems, he may either see the merit of his own, or rectify its errors, or adopt any other which may appear preferable. Thus likewise the compilers will preserve their essential character, which, by assuming the spirit or tenets of any party as their own, would be entirely destroyed.

To make the perusal of this comprehensive work as easy and successful as possible, marginal references are made from general systems to particular articles, and reciprocally from the latter to the former. Thus the diligent inquirer after truth will no longer find himself under a necessity of hunting the letters of the alphabet through all their arbitrary forms and positions, nor tantalized at last by the unsatisfactory glance of an object which the whole art or industry of man could not possibly explain in such a solitary and insulated situation. The utility of this expedient will sufficiently appear from the following instance; and from hence we may likewise see how abortive and impotent the attempts of some authors have proved who by references have tried to direct us how we may form a full system from independent topics. From the preface of Chamber's Dictionary the subsequent may be quoted as an example. "AGRICULTURE, or the *Tillage* and improvement of *Soils, Clay, Sand, Earth, &c.* by the operations of *Ploughing, Fallowing, Burning, Sembra-dore, Semination, Manuring, &c.* to produce *Corn, Hemp, Flax, Liquorice, Saffron, &c.* for *Malt, Farina, &c.* *Granary, Threshing, &c.* The culture of *Trees, Timber, &c.* by *Planting, Shrowding, Barking, &c.* for *Coppice, Park, Paddock, Hedge, Pasture, &c.* But how extremely difficult it would be to follow a subject through such a multitude of references, as well as new ones which spring up at every one of them, any person may easily conceive.

Whilst, however, we prove the expediency of references from sciences to articles, and from articles to sciences, we regret, that unavoidable contingencies in the progress of the work have sometimes put it out of our power to observe this rule with all the fidelity which we could have wished. For in several articles relating to the sciences of Optics and Medicine, instead of marginal notes, an index at the end of these articles is referred to. This, it must be owned, is attended with some little inconvenience; but it was inevitable on account of a variety of communications received after the work was begun, so that proper references could not be made to the numbers originally placed on the margin, the plan of these dissertations being somewhat altered. Besides, when the nature of a work so extensive and multiform is duly considered, it will immediately occur to every reader of candour and indulgence, how easy it is for the utmost care and assiduity to fail in some instances. These, however, it is
hoped,

hoped, will be found few and of little importance; the work, during its whole progress, having been superintended with unremitting vigilance and assiduity.

After surveying any particular science, it will be found equally useful and entertaining to acquire some notion of the private history of such eminent persons as have either invented, cultivated, or improved, the particular art or science in which our attention has been recently engaged. This has induced the compilers to enrich the *Encyclopædia Britannica* with a new department, which is not to be found in any other collection of the same kind, except in the French *Encyclopedie*. Of all historical pursuits, Biography is perhaps the most delightful and instructive. Its tendency to illustrate particular passages in general history, and to diffuse new light through the arts and sciences in which the persons whose lives are related were employed, is too obvious to require explication. Besides, it exhibits the human character in all possible forms and situations. It not only attends its hero through all the bustle of public life, but pursues him to his most sequestered retirements. It shows, how distinguished characters have been involved in misfortunes and difficulties; by what means they were extricated; or with what degree of fortitude and dignity they have discharged the various functions, or sustained the different vicissitudes, of a chequered and fluctuating life. For these reasons it is, that every man of learning and genius has esteemed the biographical labours of Plutarch among the most precious and valuable remains of antiquity. The lives and characters, therefore, of such personages as have either excelled in the arts of war or peace, of such as have either distinguished themselves in the theatre of action or in the recess of contemplation, will be found under their proper names alphabetically disposed.

When we read of the persons by whom, and the occasions on which, any particular branch of human knowledge has been cultivated, we naturally wish to know something of the places where those transactions have passed. This curiosity, so natural and laudable, has frequently been felt by the compilers of this work. And, in order to gratify a desire so useful and congenial to the human mind; besides the general system of Geography, they have subjoined to the name of each particular place, an account of its situation, its climate, its soil, its peculiarities, its inhabitants, its revolutions, laws, and government, with whatever else appeared necessary for the reader's information, and comprehensible in a work of such variety and extent.

In treating of such matters as are peculiar to certain authors, the obligation is generally acknowledged by the compilers of this Dictionary; but, in such subjects as were common to many writers, they did not imagine those acknowledgements required either by their own gratitude or the curiosity of their readers. Yet, that all possible means of improvement may be put in the power of such as wish to cultivate their taste or genius, a list of those authors who have been most distinguished and successful in the various departments of art or science will be added. It will easily occur to the reader, that these are the authors chiefly used in this compilation; and by this he will be enabled to consult each particular author in his own province. But so much pains have been taken to select and extract from each whatever is valuable, that it is hoped the necessity of this research will be in a great measure superseded. From the catalogue proposed to be given, it must appear what a considerable and extensive library would be required

to afford so much knowledge as this work contains, and what an immense disparity there is between the expense of purchasing it, and that of procuring the books from whence it was derived.

We have already hinted the almost insuperable difficulty attending the execution of a plan so various in its nature, and so considerable in its extent. To redress, therefore, as far as possible, the inconveniences arising from casual omissions, an Appendix may be thought indispensably necessary. But though the plan proposed should be accomplished in a manner equal to our own or our readers most sanguine expectations, such an Appendix would still be found a most important addition. For even though the work should be as perfect as possible according to the state of arts and sciences at the time of its exhibition, still revolutions may happen, and improvements may be made, in various branches both of theoretical and practical knowledge, which an Appendix will give the compilers a proper opportunity of inserting. This accession, therefore, to the original plan, our readers will be pleased to find.

In a collection so large and multifarious as that which is now recommended to the public attention, the critic must be severe, and the genius minute, who could stop to animadvert upon every trivial inaccuracy of style. We think it indeed indispensably incumbent on every author who would be read with intelligence and pleasure, after sufficiently attending to the nature and importance of what he submits to the public observation, that he should, in the next degree, regard the vehicle by which it is conveyed. But where the subjects are so indefinitely varied, and where propriety requires that each should be expressed in a manner suitable to its nature; it can scarcely be imagined, that the same exactness and uniformity should equally prevail in this as in compositions of a nature less extensive and complex.

After all, though the compilers are conscious of having done their utmost to render this work as extensively and generally useful as it could possibly be; yet, since no human production, even from the origin of literature to the present period, has ever been found perfect in its kind, it would be cruel, if not unjust, to expect absolute perfection in the present attempt. From every candid and benevolent inquirer after truth, therefore, they hope, that the merit of their intention and the utility of their plan will in a great measure atone for such trivial or unavoidable faults as may be found in its execution. Such was the spirit in which one of the noblest and wisest of ancient critics perused his contemporary poets:

*Verum ubi plura nitent in carmine, non ego paucis
Offendar maculis, quas aut incuria fudit,
Aut humana parum cavit natura.*—

HOR.

But where the beauties more in number shine,
I am not angry, when a casual line
(That with some trivial faults unequal flows)
A careless hand, or human frailty, shows.

FRANCIS.

A NEW D I C T I O N A R Y O F A R T S, S C I E N C E S, & C.

A,
abbreviat.

A, THE character of the first letter of the alphabet in Latin, English, French, and most of the present languages of Europe. The first character in the Hebrew alphabet is called *aleph*, in the Greek *alpha*, in the Arabic *eleph*, and in the Syriac *oleph*.

A has deservedly the first place in the alphabet on account of its simplicity, very little more being necessary to its pronunciation than opening the mouth.

A, an article. See ARTICLE.

A, among the ancients, was a numeral letter, and signified 500; and when a dash was added on the top, *A*, 5000.

A, in the Julian calendar, is the first of the seven dominical letters*. It had been in use among the Romans long before the establishment of Christianity, as the first of the eight *nundinales* † *litteræ*; in imitation whereof it was that the dominical letters were first introduced.

A is also an abbreviation, used with different intentions. Hence,

A, among logicians, is used to denote an universal affirmative proposition; according to the verse,

Afferit A, negat E, verum generaliter ambo.

Thus, in the first figure, a syllogism consisting of three universal affirmative propositions, is said to be in *Bār-bā-rā*; the *A* thrice repeated, denoting so many of the propositions to be universal, &c. See BARBARA.

A, among the Romans, was used in the giving of votes or suffrages.—When a new law was proposed, each voter had two wooden ballots put in his hand; the one marked with a capital *A*, signifying *antiquo*, q. d. *antiquam volo*; and the other with *V. R.* for *ut rogas*. Such as were against the law, cast the first into the urn: as who should say, I refuse it, I antiquate it; or, I like the ancient law, and desire no innovation.

A, in the trials of criminal causes, also denoted absolution: whence Cicero, *pro Milone*, calls *A, littera salutaris*, a saving letter.—Three ballots were distributed to each judge, marked with the letters, *A* for *absolvo*, I acquit; *C* for *condemno*, I condemn; and *N. L.* for *non liquet*, It is not clear. From the number of each cast into the urn, the prætor pronounced the prisoner's fate. If they were equal in number, he was absolved.

A, in the ancient inscriptions of marbles, &c. occasionally stands for *Augustus*, *ager*, *aiunt*, &c. When double, it denotes *Augusti*; and when triple, *aurum argentum, æ*; and sometimes its meaning can only be

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A A R

known by the rest of the inscription. Ifidore adds, that when it occurs after the word *miles* (soldier), it denotes him young. On the reverse of ancient medals, it denotes them struck by the city of Argos, sometimes by that of Athens; but on coins of modern date, it is the mark of Paris.

A, as an abbreviation, is also often found in modern writers: as, *A. D.* for *anno domini*; *A. M.* *artium magister*, master of arts, &c.

Ā, the letter a, with a line above it thus, ā, is used in medical prescriptions for *ana*, of each; sometimes it is written thus, āā: e. g. & Mel. Sacchar. & Mann. ā, vel āā, ʒj. i. e. Take of honey, sugar, and manna, of each one ounce.

A.A.A. The chemical abbreviation for Amalgama, or Amalgamation.

AA, the name of several rivers in Germany and Switzerland.

AACH, a little town in Germany, in the circle of Suabia, near the source of the river Aach, and almost equally distant from the Danube and the lake Constance. It belongs to the house of Austria; and is twelve miles north-east of Schaffhausen, and twenty-five north-west of Constance. E. Long. 9. o. Lat. 47. 55.

AAHUS, a little town in Germany, in the circle of Westphalia, and bishoprick of Munster. It is the capital of Aahus, a small district; has a good castle; and lies north-east of Coesfeldt. E. Long. 7. 1. Lat. 52. 10.

AAM, a Dutch measure of capacity for liquids, containing about 63 pounds avoirdupois weight.

AAR, the name of two rivers, the one in Switzerland, the other in Westphalia. Also the name of a small island in the Baltic.

AARON, high-priest of the Jews, and brother to Moses, was by the father's side great-grandson, and by the mother's grandson, of Levi. By God's command he met Moses at the foot of mount Horeb, and they went together into Egypt to deliver the children of Israel: he had a great share in all that Moses did for their deliverance; the scriptures call him the prophet of Moses, and he acted in that capacity after the Israelites had passed over the Red Sea. He ascended mount Sinai with two of his sons, Nadab and Abihu, and seventy elders of the people; but neither he nor they went higher than half way, from whence they saw the glory of God; only Moses and Joshua went to the top, where they staid forty days. During their absence, Aaron, overcome by the people's eager intreaties, set up the golden calf, which the Israelites worshipped by

A

his

Ἀ
Astron.

* See
Astronomy,
no 310.
† See Nundinal.

Aaron
Ab.

his consent. This calf has given rise to various conjectures. Some rabbis maintain that he did not make the golden calf; but only threw the gold into the fire, to get rid of the importunities of the people; and that certain magicians, who mingled with the Israelites at their departure from Egypt, cast this gold into the figure of a calf. According to some authors, the fear of falling a sacrifice to the resentment of the people by giving a refusal, made Aaron comply with their desire: and they alleged also, that he hoped to elude their request, by demanding of the women to contribute their ear-rings, imagining they would rather choose to remain without a visible deity, than be deprived of their personal ornaments. This affair of the golden calf happened in the third month after the Israelites came out of Egypt. In the first month of the following year, Aaron was appointed high-priest by God, which office he executed during the time that the children of Israel continued in the wilderness. He died in the fortieth year after their departure from Egypt, upon mount Hor, being then an 123 years old; A. M. 2522, of the Julian period 3262, before the Christian era 1452. With regard to the attempts of the Egyptian magicians to imitate the miracles performed by his rod, see some remarks under the article MAGIC.

AARON Ben Afer, a celebrated rabbi, who, in the fifth century, had a share in the invention of the Hebrew points and accents.

AARON of Alexandria, a Christian priest and physician, who flourished in Egypt about the year 621. He is the most ancient author who has treated of the small-pox.

AARON Harifschon, a learned rabbi and carait * in the 13th century, wrote an Hebrew grammar, printed at Constantinople 1581; probably the same with Aaron the carait, who wrote a commentary on the five books of Moses, which is in MS. in the French king's library.

AARSENS (Peter), a painter, called in Italy Pietro Longo, because of his stature, was born at Amsterdam 1519. He was eminent for all kinds of subjects; but was particularly famous for altar-pieces, and for representing a kitchen with its furniture: he had the pain to see a fine altar-piece of his destroyed by the rabble in the insurrection 1566, though a lady of Alcaer offered 200 crowns for its redemption.

AB, the eleventh month of the civil year of the Hebrews, and the fifth of their ecclesiastical year, which begins with the month Nisan. It answers to the moon of July; that is, to part of our month of the same name, and to the beginning of August: it consists of thirty days. The Jews fast on the first of this month, in memory of Aaron's death; and on the ninth, because on that day both the temple of Solomon, and that erected after the captivity, were burnt; the former by the Chaldeans, and the latter by the Romans. The same day is also remarkable among that people for the publication of Adrian's edict, wherein they were forbidden to continue in Judea, or even to look back when at a distance from Jerusalem in order to lament the desolation of that city. The 18th of the same month is also a fast among the Jews; because the lamp in the sanctuary was that night extinguished, in the time of Ahaz.

AB, in the Syriac calendar, is the name of the last summer-month. The first day of this month they call

Abba
Abadours.

ed *Saum Miriam*, the fast of the virgin, because the eastern Christians fasted from that day to the fifteenth, which was therefore called *Faster-Miriam*, the cessation of the fast of the virgin.

ABA (or rather ABAB) HANIFAH, surnamed Al-Nooman, was the son of Thabet, and born at Coufah in the 80th year of the Hegira; this is the most celebrated doctor of the orthodox Mussulmans, and his sect holds the principal esteem among the four which they indifferently follow. Notwithstanding this *, he was not very well esteemed during his life, inasmuch that the khaliff Almanzor caused him to be imprisoned at Bagdat, for having refused to subscribe to the opinion of absolute predestination, which the Mussulmans call Cadha. But afterwards Abou Joseph, who was the sovereign judge or chancellor of the empire under the khaliff Hadi, brought his doctrine into such credit, that it became a prevailing opinion. That to be a good Mussulman was to be a Hanafite. He died in the 150th year of the hegira, in the prison of Bagdat aforesaid. And it was not till 335 years after his death, that Melick Schah, a sultan of the Selgiucidan race, built for him a magnificent monument in the same city, whereto he adjoined a college peculiarly appropriated to such as made a profession of this sect. This was in the 485th year of the hegira, and Anno Christi 1092. The most eminent successors of this doctor were Ahmed Benali, Al Giaslas, and Al Razi who was the master of Nassari; and there is a mosque particularly appropriated to them in the temple of Mecca.

ABACATUAIA, in ichthyology, a barbarous name of the zeus vomer. See ZEUS.

ABACH, a market-town of Germany, in Lower Bavaria, seated on the Danube, six miles south-west of Ratibon, and twenty-nine north of Landshut. It is remarkable for Roman antiquities, and for springs of mineral waters which are said to be good for various distempers. E. Long. 11. 56. Lat. 48. 53.

ABACK (a sea-term), the situation of the sails when their surfaces are flatted against the masts by the force of the wind. The sails are laid to be *taken aback*, when they are brought into this situation, either by a sudden change of the wind, or by an alteration in the ship's course. They are *laid aback*, to effect an immediate retreat, without turning to the right or left; or, in the seaphrase, to give the ship *stern-way*, in order to avoid some danger discovered before her in a narrow channel, or when she has advanced beyond her station in the line of battle, or otherwise. The sails are placed in this position by slackening their lee-braces, and hauling in the weather ones; so that the whole effort of the wind is exerted on the forepart of their surface, which readily pushes the ship astern, unless she is restrained by some counteracting force. See BACKING, and BRACING. It is also usual to spread some sail aback near the stern, as the mizzen-top-sail, when a ship rides with a single anchor in a road, in order to prevent her from approaching it so as to entangle the flukes of it with her slackened cable, and thereby loosen it from the ground.

ABACOT, the name of an ancient cap of state worn by the kings of England, the upper part whereof was in the form of a double crown.

ABACTORS, or ABACTORES, a name given to those who drive away, or rather steal, cattle by herds,

or.

* Herbelot.
Bibl. Orient.
p. 21.

* See Carait.
trails.

Abaci,
various.

or great numbers at once; and are therefore very properly distinguished from *fures*, or thieves.

ABACUS, among the ancients, was a kind of cupboard, or buffet. Livy, describing the luxury into which the Romans degenerated after the conquest of Asia, says, They had their *abaci*, beds, &c. plated over with gold. (Dec. IV. Lib. ix.)

ABACUS, among the ancient mathematicians, signified a table covered with dust, on which they drew their diagrams; the word in this sense being derived from the Phœnician *abak*, dust.

ABACUS, in architecture, signifies the superior part or member of the capital of a column, and serves as a kind of crowning to both. Vitruvius tells us the abacus was originally intended to represent a square tile laid over an urn, or rather over a basket.—An Athenian old woman happening to place a basket, thus covered, over the roof of an acanthus; that plant shooting up the following spring, encompassed the basket all round, till meeting with the tile, it curled back in a kind of scroll. An ingenious sculptor passing by, took the hint, and immediately executed a capital on this plan; representing the brick by the abacus, the leaves by the volutes, and the basket by the vase, or body of the capital. Such was the rise of the first regular order.—The form of the abacus is not the same in all orders: in the Tuscan, Doric, and Ionic, it is generally square; but in the Corinthian and Composite, its four sides are arched inwards, and embellished in the middle with some ornament, as a rose or other flower. Scamozzi uses *abacus* for a concave moulding on the capital of the Tuscan pedestal; and Palladio calls the plinth above the echinus, or boustin, in the Tuscan and Doric orders, by the same name*.

* See Pl. I. fig. 11.

ABACUS is also the name of an ancient instrument for facilitating operations in arithmetic. It is variously contrived. That chiefly used in Europe is made by drawing any number of parallel lines at the distance of two diameters of one of the counters used in the calculation. A counter placed on the lowest line, signifies 1; on the 2d, 10; on the 3d, 100; on the 4th, 1000, &c. In the intermediate spaces, the same counters are estimated at one half of the value of the line immediately superior, viz. between the 1st and 2d, 5; between the 2d and 3d, 50, &c. See Plate I. fig. 2. A B, where the same number, 1777 for example, is represented under both by different dispositions of the counters:

Chinese ABACUS. See CHINESE-SWANPAN.

ABACUS *Pythagoricus*, the common multiplication-table; so called from its being invented by Pythagoras.

ABACUS is also used by modern writers for a table of numbers ready cast up, to expedite the operations of arithmetic. In this sense we have *Abaci* of addition, of multiplication, of division; an *Abacus logarithmicus*; *Abacus* of squares, of cubes, &c.

ABACUS *Logisticus* is a rectangled triangle, whose sides, forming the right angle, contain the numbers from 1 to 60; and its area, the facta of each two of the numbers perpendicularly opposite. This is also called a *canon of sexagesimalis*.

ABACUS & *Palmule*, in the ancient music, denote the machinery, whereby the strings of polyplectra, or instruments of many strings, were struck with a plectrum made of quills.

ABACUS *Harmonicus*, is used by Kircher for the

structure and disposition of the keys of a musical instrument, whether to be touched with the hands or the feet.

ABACUS *Major*, in metallurgic operations, the name of a trough used in the mines, wherein the ore is washed.

ABADDON, is the name which St John in the Revelations gives to the king of the locust, the angel of the bottomless pit. The inspired writer says, this word is Hebrew, and in Greek signifies *Ἀβaddon*, i. e. a destroyer. That angel-king is thought to be Satan or the devil: but Mr le Clerc thinks*, with Dr Hammond, that by the locust which came out of the abyss, may be understood the zealots and robbers, who miserably afflicted the land of Judea, and laid it in a manner waste, before Jerusalem was taken by the Romans; and that Abaddon, the king of the locust, may be John of Gischala, who, having treacherously left that town a little before it was surrendered to Titus, came to Jerusalem, where he soon headed part of the zealots, who acknowledged him as their king; whilst the rest would not submit to him. This subdivision of the zealot-party brought a thousand calamities on the Jews.

ABADIR, a title which the Carthaginians gave to gods of the first order. In the Roman mythology, it is the name of a stone which Saturn swallowed, by the contrivance of his wife Ops, believing it to be his new-born son Jupiter: hence it ridiculously became the object of religious worship.

ABÆ, or ABA, a town of Phocis in Greece, near Hælicon; famous for an oracle of Apollo older than that at Delphi, and for a rich temple plundered and burnt by the Persians. (Strabo.)

ABAST, a sea-term, signifying the hinder part of a ship, or all those parts both within and without which lie towards the stern, in opposition to AFORE; which see.—*Abast*, is also used as a preposition, and signifies further aft, or nearer the stern; as, the barricade stands *abast* the main-mast, i. e. behind it, or nearer the stern.

ABAISED, *Abaisse*, in heraldry, an epithet applied to the wings of eagles, &c. when the tip looks downwards to the point of the shield, or when the wings are flut, the natural way of bearing them being extended.

ABALAK, a town in Siberia, two miles from Tobolskoi, where there is a famous picture of the Virgin Mary, that is constantly visited by a great number of pilgrims: the clergy carry this image every year in procession to Tobolskoi, where it is kept for a fortnight. E. Long. 64. 10. Lat. 57. 1.

ABALIENATION, in law, the act of transferring one man's property to another.

ABALIENATUS, among physicians, means corrupted. When applied to the body, it signifies that a part is so destroyed as to require extirpation. When applied to the senses, it expresses their total destruction.

ABALLABA, now *Appleby*, a town in Westmoreland, remarkable only for its antiquity, having been a Roman station. (Notitia Imperii.) See APPLEYB.

ABANA, (Bible,) otherwise *Amana*, a river of Phœnicia, which, rising from mount Hermon, washes the south and west sides of Damascus, and falls into the Phœnician sea, to the north of Tripolis, called *Chrysorrhoas* by the Greeks.

ABANGA, the name of the fruit of the palm-tree, in the island of St Thomas. The tree is the *Palma Ady*

Abaddon
||
Abanga.

* Hammi.
on Rev. ix.
& le Clerc's
Suppl.

† Joseph.
de bel. Jud.
lib. iv. c. 2, 7.
Haverc.

Abano
||
Abaris.

* See *Ady.*

Infula S. Thome, C. B. The fruit is like a lemon externally; and the inhabitants give three or four of the kernels two or three times a-day as a restorative *.

ABANO, a town of the Paduano, in the republic of Venice, famous among the ancients for its hot baths. It is five miles south-west of Padua, and fifteen south-east of Vicentia. E. Long. 10. 7. Lat. 45. 20.

ABANTES, a people who came originally from Thrace, and settled in Phocæa, a country of Greece, where they built a town which they called Aba, after the name of Abas their leader; and, if we may credit some ancient authors, the Abantes went afterwards into the island Eubæa, now called Negropont: others say the Abantes of Eubæa came from Athens. The Abantes were a very warlike people, closing with their enemies, and fighting hand to hand. See next article.

ABANTIAS, or ABANTIS, a name of the island Eubæa, in the Egean sea, extending along the coast of Greece, from the promontory Sunium of Attica to Theffaly; and separated from Boeotia by a narrow strait, called Euripus. From its length the island was formerly called *Macris*: afterwards *Abantias*, or *Abantis*, from the Abantes, a people originally of Thrace, called by Homer *ἄβαντιες ἀπὸ θράκης*, from wearing their hair long behind, having in a battle experienced the inconvenience of wearing it long before; and from cutting their forelocks, they were called *Curetes*. (*Abanteus*, the epithet; Ovid.) See *ABANTES*.

ABAPTISTON, in furgery, the perforating part of the instrument called a trepan. The word is from the negative α, and *βαπτο* to sink under. This instrument hath had various contrivances to prevent its sinking suddenly upon the membranes of the brain when the operator was fawing the skull: whence its name. But the present practice proves all precautions needless, unless the operator is attentive and careful when he uses this instrument.

ABARA, a town in the Greater Armenia, under the dominion of the Turks: it is often the residence of the archbishop of Nakhivan, from which place it is twenty miles north. Long. 46. 25. Lat. 39. 45.

ABARANER, a town of Asia, in Grand Armenia, belonging to the Turks. It is seated on the river Alingena, twenty miles north of Nakhivan. Long. 46. 30. Lat. 39. 50.

ABARIM, high mountains of steep ascent, separating the country of the Ammonites and Moabites from the land of Canaan, where Moses died. According to Josephus, they stood opposite to the territory of Jericho, and were the last station but one of the Israelites coming from Egypt. Nebah and Pisgah were parts of these mountains.

ABARIS, the Hyperborean; a celebrated sage of antiquity, whose history and travels have been the subject of much learned discussion. Such a number of fabulous stories* were told of him, that Herodotus himself seems to scruple to relate them. He tells us only†, that this Barbarian was said to have travelled with an arrow, and took no sustenance: but this does not acquaint us with the marvellous properties which were attributed to that arrow; nor that it had been given him by the Hyperborean Apollo. With regard to the occasion of his leaving his native country, Harporcation‡ tells us, that the whole earth being infested with a deadly plague, Apollo, upon being consulted, gave no other

answer, than that the Athenians should offer up prayers in behalf of all other nations: upon which, several countries deputed ambassadors to Athens, among whom was Abaris the Hyperborean. In this journey, he renewed the alliance between his countrymen and the inhabitants of the island of Delos. It appears that he also went to Lacedæmon; since, according to some writers||, he there built a temple consecrated to Proserpine the Salutary. It is asserted, that he was capable of foretelling earthquakes, driving away plagues, laying storms †, &c. He wrote several books, as Suidas† informs us, viz. Apollo's arrival into the country of the Hyperboreans; The nuptials of the river Hebrus; *Θεογονία*, or the Generation of the Gods; A collection of oracles; &c. Himerius* the sophist applauds him for speaking pure Greek; which attainment will be no matter of wonder to such as consider the ancient intercourse there was between the Greeks and Hyperboreans.—If the Hebrides, or Western Islands of Scotland, (says Mr Toland†), were the Hyperboreans of Diodorus‡, then the celebrated Abaris was of that country; and likewise a druid, having been the priest of Apollo. Suidas, who knew not the distinction of the insular Hyperboreans, makes him a Scythian; as do some others, misled by the same vulgar error; though Diodorus has truly fixed his country in an island, and not on the continent. And indeed the fictions and mistakes concerning our Abaris are infinite: however, it is by all agreed that he travelled quite over Greece, and from thence into Italy, where he conversed familiarly with Pythagoras, who favoured him beyond all his disciples, by instructing him in his doctrines (especially his thoughts of nature) in a plainer and more compendious method than he did any other. This distinction could not but be very advantageous to Abaris. The Hyperborean, in return, presented the Samian, as though he equalled Apollo himself in wisdom, with the sacred arrow, on which the Greeks have fabulously related* that he sat astride, and flew upon it, through the air, over rivers and lakes, forests and mountains; in like manner as our vulgar still believe, particularly those of the Hebrides, that wizards and witches fly whithersoever they please on their broomsticks. The orator Himerius above mentioned, tho' one of those who, from the equivocal sense of the word Hyperborean, seem to have mistaken Abaris for a Scythian, yet describes his person accurately, and gives him a very noble character. "They relate (says he) " that Abaris the sage was by nation an Hyperborean, appeared a Grecian in speech, and resembled " a Scythian in his habit and appearance. He came " to Athens, holding a bow in his hand, having a " quiver hanging on his shoulders, his body wrapt up " in a plad, girt about the loins with a gilded belt, " and wearing trowsers reaching from his waste down- " ward." By this it is evident (continues Mr Toland) that he was not habited like a Scythian, who were always covered with skins; but appeared in the native garb of an Aboriginal Scot. As to what relates to his abilities, Himerius informs us, that " he " was affable and pleasant in conversation, in dispatch- " ing great affairs secret and industrious, quick-sighted " in present exigencies, in preventing future dangers circumspiciet, a searcher after wisdom, desirous of friendship, trusting indeed little to fortune, and having every " thing

Abaris
the Hyper-
borean.

|| Pausanias,
lib. iii. p. 94.

† Porphyry
in *Vita Pythagor.*

‡ Under the word *Ἀβαν-
των*.

§ Fragment
of his Ora-
tion pre-
served by Phae-
stus in his
Bibliotheca,
p. 1136.

† Account
of the Drui-
ds, in his
*Pythagorus
Works*, vol. I.
p. 161.

‡ Diod. Sic.
lib. ii. iii.

* Jamblichus
Vita Pythag.
p. 128.

* Jamblichus
Vita Pythag.
† Lib. iv.
esp. 36.

‡ Under the
word *Ἀβαν-
των*.

Abarti-
culatio
||
Abscissa.

"thing trusted to him for his prudence." Neither the Academy nor the Lyceum could have furnished a man with fitter qualities to travel so far abroad, and to such wife nations, about affairs no less arduous than important. And if we further attentively consider his moderation in eating, drinking, and the use of all those things which our natural appetites incessantly crave; joining the candour and simplicity of his manners with the solidity and wisdom of his answers, all which we find sufficiently attested; it must be owned, that the world at that time had few to compare with Abaris.

ABARTICULATIO, in anatomy, a species of articulation admitting of a manifest motion; called also *Diarthrosis*, and *Dearticulation*, to distinguish it from that sort of articulation which admits of a very obscure motion, and is called *Synarthrosis*. See **ARTICULATIO**.

ABAS, a weight used in Persia for weighing pearls. It is 1-8th less than the European carat.

ABAS, in the heathen mythology, was the son of Hypothoon and Meganira, who entertained Ceres, and offered a sacrifice to that goddess; but Abas ridiculing the ceremony, and giving her opprobrious language, she sprinkled him with a certain mixture the held in her cup, on which he became a newt or water-lizard.

ABAS (Schah) the Great, was third son of Codabendi, 7th king of Persia, of the race of the Sophis. Succeeding to his father at 18, in 1585, he found the affairs of Persia at a low ebb, occasioned by the conquests of the Turks and Tartars. He regained several of the provinces they had seized; but death put a stop to his victories in 1629, after a reign of 44 years. He was the greatest prince that had reigned in Persia for many ages; and it was he who made Ispahan the metropolis of Persia: his memory is held in the highest veneration among the Persians.

ABAS (Schah) his grandson, 9th king of Persia, of the race of the Sophis, succeeded his father Sefi at 13 years of age: he was but 18 when he made himself master of the city Candahar, which had surrendered in his father's reign to the Great Mogul, and all the province about it; and he preserved it afterwards against this Indian emperor, though he besieged it more than once with an army of 300,000 men. He was a very merciful prince, and openly protected the Christians: he had formed a design of extending the limits of his kingdom toward the north, and had for that effect levied a powerful army; but death put a stop to all his great designs, at 37 years of age, in 1666.

ABASCIA, or **ABCAS**, a country in Asia, tributary to the Turks, situated on the coast of the Black Sea. The people are poor, thievish, and treacherous, inasmuch that there is no trading with them without the utmost caution. Their commodities are furs, buck and tyger skins, linen yarn, boxwood, and bees-wax: but their greatest traffic is in selling their own children, and even one another, to the Turks; inasmuch that they live in perpetual distrust. They are destitute of many necessities of life, and have nothing among them that can be called a town; though we find Anacopia, Dandar, and Czekorni, mentioned in the maps. They have the name of Christians; but have nothing left but the name, any more than the Mingrelians their northern neighbours. The men are robust and active, and the women are fair and beautiful; on which account the Turks have a great value for the female slaves which they

purchase from among them. Their customs are much the same as those of the **MINGRELIANS**; which see. E. Long. from 39 to 43. Lat. from 43 to 45.

ABASSI, or **ABASSIS**, a silver coin current in Persia, equivalent in value to a French livre, or tenpence halfpenny Sterling. It took its name from Schah Abas II. king of Persia, under whom it was struck.

ABATAMENTUM, in law, is an entry to lands by interposition, *i. e.* when a person dies seized, and another who has no right enters before the heir.

To ABATE, (from the French *abbatre*, to pull down, overthrow, demolish, batter down, or destroy), a term used by the writers of the English common-law both in an active and neutral sense; as, To abate a castle, is to beat it down. To abate a writ, is, by some exception, to defeat or overthrow it. A stranger abateth; that is, entereth upon a house or land void by the death of him that last possessed it, before the heir takes possession, and so keepeth him out: wherefore, as he that putteth out him in possession is said to disfeize, so he that steppeth in between the former possessor and his heir is said to abate. In the neuter signification thus: The writ of the demandant shall abate; that is, shall be disabled, frustrated, or overthrown. The appeal abateth by covin; that is, the accusation is defeated by deceit.

ABATE, in the manege, implies the performing any downward motion properly. Thus a horse is said to abate or take down his curvets, when he puts both his hind legs to the ground at once, and observes the same exactness in all the times.

ABATEMENT, in heraldry, an accidental figure supposed to have been added to coats-of-arms, in order to denote some dishonourable demeanour or stain, whereby the dignity of the coat-armour was rendered of less esteem. See **HERALDRY**, n^o 12, l.

ABATEMENT, in law. See **To ABATE**.

ABATEMENT, in the customs, an allowance made upon the duty of goods, when the quantum damaged is determined by the judgment of two merchants upon oath, and ascertained by a certificate from the surveyor and land-waiter.

ABATIS, an ancient term for an officer of the stables.

ABATOR, in law, a term applied to a person who enters to a house or lands, void by the death of the last possessor, before the true heir.

ABATOS, an island in the lake Mœris, formerly famous for its flax and papyrus. It was the burial-place of Osiris, (Lucan.)

ABAVO, in botany, a synonyme of the *adanfonia* *.
ABB, a term, among clothiers, applied to the yarn of a weaver's warp. They also say *Abb-wool* in the same sense.

ABBA, in the Syriac and Chaldee languages, literally signifies a *father* *, and figuratively, a superior, reputed as a father in respect of age, dignity, or affection. It is also a Jewish title of honour given to some of the class called Tanaites.

ABBADIE (James) an eminent Protestant divine, born at Nay in Bern, in 1654; first educated there under the famous John la Placette, and afterward at the university of Sedan. From thence he went into Holland and Germany, and was minister in the French church of Berlin. He left that place in 1690; came into England; was sometime minister in the French church in the Savoy, London; and was made dean of Killaloe in Ireland. He died at St Mary le Bonne near London, in 1727, aged

Abaffi
||
Abbadie.

* See *Adanfonia*.

* See *Abbot*.

Abbas
||
Abbe.

aged 73. He was strongly attached to the cause of king William, as appears in his elaborate defence of the revolution, and his history of the assassination-plot. He had great natural abilities, which he improved by true and useful learning. He was a most zealous defender of the primitive doctrine of the Protestants, as appears by his writings; and that strong nervous eloquence, for which he was so remarkable, enabled him to enforce the doctrines of his profession from the pulpit with great spirit and energy. He published several works in French that were much esteemed; the principal of which are, A Treatise on the Truth of the Christian Religion; The art of Knowing one's Self; A Defence of the British Nation; and, The History of the last Conspiracy in England, written by order of king William III.

ABBAS, son of Abdalmotheb, and Mahomet's uncle, opposed his nephew with all his power, esteeming him an impostor and infidel; but in the second year of the hegira, being overcome and made a prisoner at the battle of Bendir in 623, a great ransom being demanded for him, he represented to Mahomet, that his paying it would reduce him to poverty, which would redound to the dishonour of the family. But Mahomet having been informed of Abbas's having secreted large sums of money, asked him after the purses of gold he had left in his mother's custody at Mecca. Abbas, upon this, conceiving him to be really a prophet, embraced his new religion; became one of his principal captains; and saved his life when in imminent danger at the battle of Henain, against the Thakéites, soon after the reduction of Mecca. But besides being a great commander, Abbas was a famous doctor of the Mussulman law, inasmuch that he read lectures upon every chapter of the Koran, as his nephew pretended to receive them one by one from heaven. He died in 652, and his memory is held in the highest veneration among the Mussulmans to this day.

Abul ABBAS, surnamed *Sassah*, was proclaimed khalif; and in him began the Dynast of the

ABBASSIDES, who possessed the khalifate for 524 years; and there were 37 khalifs of this race who succeeded one another without interruption.

* See *Abbot*. ABBE, in a monastic sense, the same with Abbot *.

ABBE, in a modern sense, is the name of a curious popular character in France, very much mentioned, but very little known, in Britain. The term is not to be rendered in our language, as the existence of the being which it denominates is posterior to the reformation, and no such character was known among the Romanists till about a century and a half ago.

Abbés, according to the strictest definition, are persons who have not yet obtained any precise or fixed settlement in church or state, but most heartily wish for, and would accept of, either, just as it may happen. In the mean while, their privileges are many. They are admissible in all companies, and no degradation to the best, notwithstanding they are sometimes found in the world. Their dress is rather that of an academic, or of a professed scholar, than of an ecclesiastic; and, never varying in colour, is no incumbrance on the pocket.

These abbés are very numerous, and no less useful. They are, in colleges, the instructors of youth; in private families, the tutors of young gentlemen; and many procure a decent livelihood by their literary and witty compositions of all kinds, from the profoundest philo-

sophy to the most airy romances. They are, in short, a body of men who possess a fund of universal talents and learning, and are incessantly employed in the cultivation of every various branch of literature and ingenuity. No subject whatever escapes them; serious or gay, solid or ludicrous, sacred or profane, all pay tribute to their researches; and as they are conversant in the lowest as well as the highest topics, their fame is equally great in the learned and in the scribbling world.—A distinguishing part of their character, too, though we shall but slightly touch it, is their devotion to the fair sex: whose favourites, in return, they have the honour of being in the most enviable degree; the wit and smartness for which they are usually remarkable, being just the very things that suit the French ladies.—In fine, these abbés are sought after by most people, on various accounts; as they are equally men of business and pleasure, not less expert in the most serious transactions, than fond of enjoying their share of whatever occupies the gay world. Hence they diligently frequent all public spectacles, which are thought incomplete without them; as they compose the most intelligent part of the company, and are the most weighty approvers or condemners of what passes in almost all places.

ABBESS, the superior of an abbey or convent of nuns *. The abbess has the same rights and authority over her nuns, that the abbots regular have over their monks. The sex indeed does not allow her to perform the spiritual functions annexed to the priesthood, where-with the abbot is usually invested; but there are instances of some abbesses who have a right, or rather a privilege, to commission a priest to act for them. They have even a kind of episcopal jurisdiction, as well as some abbots who are exempted from the visitation of their diocessans.

ABBEVILLE, a considerable city of France in Picardy, and the capital of Ponthieu; the river Somme runs through the middle of it, and divides it into two parts. It has a collegiate church and twelve parish-churches, the most considerable of which are St George's and St Giles's, besides a great number of monasteries and nunneries, a bailiwick, and a prebendal court. It is a fortified town; the walls are flanked with bastions, and surrounded by large ditches; and it was never yet taken. The country about it is low, marshy, and dirty. It is pretty well peopled, and is famous for its woollen manufactory. It is about fifteen miles east of the British channel, and thips may come from thence by the river Somme to the middle of the town. It is ninety miles almost directly north of Paris. E. Long. 2. 6. Lat. 50. 7.

ABBEY, a monastery, or religious house, governed by a superior under the title of abbot or abbess *.

Abbeys differ from *priories*, in that the former are under the direction of an abbot, and the others of a prior †: but abbot and prior (we mean a prior conventual) are much the same thing, differing in little but the name.

Faucher observes, that, in the early days of the French monarchy, dukes and counts were called *abbots*, and duchies and counties *abbeyes*. Even some of their kings are mentioned in history under the title of abbots. Philip I. Louis VI. and afterwards the dukes of Orleans, are called abbots of the monastery of St Aignan. The dukes of Aquitaine were called abbots of the monastery of St Hilary, at Poitiers; and the earls of Anjou of St Aubin, &c.

Abbe
||
Abbey.

* See *Abbey*
and *Nun*.

* See *Abbot*
and *Abbess*.

† See *Prior*.

Abbey
|
Abbot.

Abbot,
or
Abbat.

* See Monk
and Archi-
mandrite.

Monasteries were at first nothing more than religious houses, whither persons retired from the bustle of the world to spend their time in solitude and devotion. But they soon degenerated from their original institution, and procured large privileges, exemptions, and riches. They prevailed greatly in Britain before the reformation; particularly in England: and as they increased in riches, so the state became poor; for the lands, which these regulars possessed, were *in mortua manu*, i. e. could never revert to the lords who gave them. This inconvenience gave rise to the statutes against gifts in *mortmain*, which prohibited donations to these religious houses; and Lord Coke tells us, that several lords, at their creation, had a clause in their grant, that the Donor might give or sell his land to whom he would (*exceptis viris Religiosis & Judais*) excepting Monks and Jews.

These places were wholly abolished in England at the time of the Reformation; Henry VIII. having first appointed visitors to inspect into the lives of the monks and nuns, which were found very disorderly: upon which, the abbots, perceiving their dissolution unavoidable, were induced to resign their houses to the king, who by that means became invested with the abbey-lands: these were afterwards granted to different persons, whose descendants enjoy them at this day: they were then valued at 2,853,000 *l.* per annum, an immense sum in those days.

ABBEY-BOYLE, a town of Ireland, in the county of Roscommon and province of Connaught, twenty-three miles north of Roscommon. W. Long. 8. 32. Lat. 56. 54. It is remarkable for an old abbey.

ABBEY-HOLM, a town in Cumberland, so called from an abbey built there by David king of Scots. It stands on an arm of the sea, and had a market on Saturdays; it has now a fair on October 29, for horses and horned cattle: it is sixteen miles south-west of Carlisle. W. Long. 2. 38. Lat. 54. 45.

ABBOT, or ABBAT, the superior of a monastery of monks erected into an abbey or prelate.*

* See Abbey
and Abbot.

The name *Abbot* is originally Hebrew, where it signifies father. The Jews call *father*, in their language, *Ab*; whence the Chaldeans and Syrians formed *Abba*; thence the Greeks *Ἀββας*, which the Latins retained, *Abbas*; and hence our *Abbot*, the French *Abbé*, &c. — St Mark and St Paul use the Syriac *Abba* in their Greek, by reason it was then commonly known in the synagogues and the primitive assemblies of the Christians; adding to it, by way of interpretation, the word *father*, *Ἀββὰ ο πατὴρ*, “*Abba, father*,” *q. d.* *Abba*, that is to say, Father. — But the name *Ab*, and *Abba*, which at first was a term of tenderness and affection in the Hebrew and Chaldean, became at length a title of dignity and honour: The Jewish doctors affected it; and one of their most ancient books, containing the sayings or apophthegms of divers of them, is entitled *Pirke Abbot*, or *Avot*; i. e. Chapters of the Fathers. It was in allusion to this affection, that Jesus Christ forbade his disciples to call any man their father on earth; which word St Jerome turns against the superiors of the monasteries of his time, for assuming the title of *Abbots*, or Fathers.

The name *Abbot*, then, appears as old as the institution of monks itself. — The governors of the primitive monasteries assumed indifferently the titles *Abbots*,

and *Archimandrites**. They were really distinguished from the clergy; though frequently confounded with them, because a degree above laymen.

In those early days, the abbots were subject to the bishops and the ordinary pastors. Their monasteries being remote from cities, built in the farthest solitudes, they had no share in ecclesiastical affairs. They went on Sundays to the parish-church with the rest of the people; or, if they were too remote, a priest was sent them to administer the sacraments; till at length they were allowed to have priests of their own body. The abbot or archimandrite himself was usually the priest: but his function extended no farther than to the spiritual assistance of his monastery; and he remained still in obedience to the bishop. There being among the abbots several persons of learning, they made a vigorous opposition to the rising heresies of those times; which first occasioned the bishops to call them out of their deserts, and fix them about the suburbs of cities, and at length in the cities themselves: from which era their degeneracy is to be dated. The abbots, now, soon wore off their former plainness and simplicity, and began to be looked on as a sort of little prelates. They aspired at being independent of the bishops; and became so insupportable, that some severe laws were made against them at the council of Chalcedon: this notwithstanding, in time many of them carried the point of independency; and got the appellation of *lord*, with other badges of the episcopate, particularly the mitre.

Hence arose new species of distinctions between the abbots. Those were termed *mitred* abbots, who were privileged to wear the mitre, and exercise episcopal authority within their respective precincts, being exempted from the jurisdiction of the bishop. Others were called *croziered* abbots, from their bearing the crozier or pastoral staff. Others were styled *acemical* or universal abbots, in imitation of the patriarch of Constantinople: while others were termed *cardinal* abbots, from their superiority over all other abbots. — Among us, the mitred abbots were lords of parliament; and called abbots-*sovereign*, and abbots-general, to distinguish them from the other abbots. And as there were lords abbots, so there were also lords priors, who had exempt jurisdiction, and were likewise lords of Parliament. Some reckon 26 of these lords abbots and priors, that sat in parliament. Sir Edward Coke says, that there were 27 parliamentary abbots, and two priors. In the parliament 20 Rich. II. there were but 25 abbots, and two priors: but in the summons to parliament, anno 4 Ed. III. more are named.

At present, in the Roman-catholic countries, the principal distinctions observed between abbots, are those of *regular* and *commendatory*. The former take the vow and wear the habit of their order; whereas the latter are seculars, though they are obliged by their bulls to take orders when of proper age.

Antiently the ceremony of creating an abbot consisted in cloathing him with the habit called *cuculla*, or cowl; putting the pastoral staff into his hand, and the shoes called *pedales* on his feet; but at present, it is only a simple benediction, improperly called, by some, consecration.

ABBOT is also a title given to others beside the superiors of monasteries: thus bishops, whose sees were formerly abbeyes, are called abbots; as are the superiors of some congregations of regular canons, particularly

Archbishop
Abbot.

cularly that of St Geneviève at Paris; and among the Genoëse, the chief magistrate of their republic formerly bore the title of abbot of the people. It was likewise usual, about the time of Charlemagne, for several lords to assume the title of *count-abbot*, *abba-comites*; and that for no other reason, but because the superintendency of certain abbeyes was committed to them.

ABBOT (George), archbishop of Canterbury, was born October 29. 1562, at Guildford in Surrey. He went through his studies at Oxford, and in 1597 was chosen principal of Univerſity College. In 1599, he was installed dean of Winchester: the year following, he was chosen vice-chancellor of the university of Oxford, and a second time in 1603. In 1604, that translation of the bible now in use was begun by the direction of king James; and Dr Abbot was the second of eight divines of Oxford, to whom the care of translating the whole New Testament (excepting the epistles) was committed. The year following, he was a third time vice-chancellor. In 1608, he went to Scotland with George Hume earl of Dunbar, to assist in establishing an union betwixt the kirk of Scotland and the church of England; and in this affair he behaved* with so much address and moderation, that it laid the foundation of all his future preferment. For king James ever after paid great deference to his advice and counsel; and upon the death of Dr Overton bishop of Litchfield and Coventry, he named Dr Abbot for his successor, who was accordingly consecrated bishop of those two united sees in December 1609. About a month afterwards he was translated to the see of London, and on the second of November thereafter was raised to the archiepiscopal see. His great zeal for the Protestant religion made him a strenuous promoter of the match between the Elector Palatine and the princess Elizabeth; which was accordingly concluded and solemnized the 14th of February 1612, the archbishop performing the ceremony on a stage erected in the royal chapel. In the following year happened the famous case of divorce betwixt the lady Francis Howard, daughter of the earl of Suffolk, and Robert earl of Essex: an affair which has been by many considered as one of the greatest blemishes of king James's reign; but the part acted therein by the archbishop added much to the reputation he had already acquired for incorruptible integrity. The matter was by the king referred to a court of delegates. The archbishop saw plainly, that his Majesty was very desirous the lady should be divorced; but he was, in his own judgment, directly against the divorce. He laboured all he could to extricate himself from this difficulty, by having an end put to the cause by some other way than by sentence: but it was to no purpose; for those who drove on this affair, had got too great power to be restrained from bringing it to the conclusion the king desired. The archbishop prepared a speech, which he intended to have spoken against the nullity of the marriage, in the court at Lambeth; but he did not make use of it, because the king ordered the opinions to be given in few words. He continued, however, inflexible in his opinion against the divorce; and drew up his reasons, which the king thought fit to answer himself. It need scarce be added, that sentence was given in the lady's favour.—In 1618, the king published a declaration, which he ordered to be read in all churches, permitting sports and pastimes on the Lord's

* Heylin's
hist. of Pres-
byterians,
p. 83.

day: this gave great uneasiness to the archbishop; who, happening to be at Croydon when it came thither, had the courage to forbid its being read.—Being now in a declining state of health, the archbishop used in the summer to go to Hampshire for the sake of recreation; and being invited by lord Zouch to hunt in his park at Bramzell, he met there with the greatest misfortune that ever befell him; for he accidentally killed the game-keeper, by an arrow from a cross-bow which he shot at one of the deer. This accident threw him into a deep melancholy; and he ever afterwards kept a monthly fast on Tuesday, the day on which this fatal mischance happened, and he settled an annuity of 20*l*. on the widow*. There were several persons who took an advantage of this misfortune, to lessen him in the king's favour; but his Majesty said, "An angel might have miscarried in this sort." His enemies alleging that he had incurred an irregularity, and was thereby incapacitated for performing the offices of a primate; the king directed a commission to ten persons to inquire into this matter. The result, however, was not satisfactory to his Grace's enemies; it being declared, that, as the murder was involuntary, he had not forfeited his archiepiscopal character. The archbishop thenceforward seldom assisted at the council, being chiefly hindered by his infirmities; but in the king's last illness he was sent for, and attended with great constancy till his Majesty expired on the 27th of March 1625. He performed the ceremony of the coronation of king Charles I. though very infirm and much troubled with the gout. He was never greatly in this king's favour; and the duke of Buckingham being his declared enemy, watched an opportunity of making him feel the weight of his displeasure. This he at last accomplished, upon the archbishop's refusing to license a sermon, preached by Dr Sibthorpe to justify a loan which the king had demanded, and pregnant with principles which tended to overthrow the constitution. The archbishop was immediately after suspended from all his functions as primate; and they were exercised by certain bishops commissioned by the king, of whom Laud, the archb^p's enemy, and afterwards his successor, was one: while the only cause assigned for this procedure was, That the archbishop could not at that time personally attend those services which were otherwise proper for his cognisance and direction. He did not, however, remain long in this situation; for a parliament being absolutely necessary, his Grace was sent for, and restored to his authority and jurisdiction. But not proving friendly to certain rigorous measures adopted by the prevailing church-party, headed by Laud, whose power and interest at court was now very considerable, his presence became unwelcome there; so that upon the birth of the prince of Wales, afterwards Charles II. Laud had the honour to baptize him, as dean of the chapel. The archbishop being worn out with cares and infirmities, died at Croydon, the 5th of August 1633, aged seventy-one years; and was buried at Guildford, the place of his nativity, and where he had endowed an hospital with lands to the amount of 300*l*. per annum. A stately monument was erected over the grave, with the effigy of the archbishop in his robes. He shewed himself, in most circumstances of his life, a man of great moderation to all parties; and was desirous that the clergy should attract the esteem of the laity by the sanctity

Archbishop
Abbot.

* Fuller's
church-hist.
cent. xviii.
p. 87.

Abbot
(Robert)

sanctity of their manners, rather than claim it as due to their function. His notions and principles, however, not suiting the humour of some writers, have drawn upon him many severe reflections; particularly, which is to be regretted, from the earl of Clarendon. But Dr Welwood has done more justice to his merit and abilities *. He wrote several tracts upon various subjects; and, as already mentioned, translated part of the New Testament, with the rest of the Oxford divines, 1611.

* Memoirs,
8vo. 1700.
p. 38.

ABBOT (Robert,) elder brother to the former, and born at Guilford in 1560, went through his studies in Baliol college, Oxford. In 1582, he took his degree of master of arts, and soon became a celebrated preacher; and to this talent he chiefly owed his preferment. Upon his first sermon at Worcester, he was chosen lecturer in that city, and soon after rector of All-saints in the same place. John Stanhope, esq; happening to hear him preach at Paul's-croft, was so pleased with him, that he immediately presented him to the rich living of Bingham in Nottinghamshire. In 1597, he took his degree of doctor in divinity; and, in the beginning of king James's reign, was appointed chaplain in ordinary to his Majesty; who had such an opinion of him as a writer, that he ordered the doctor's book *De Antichristo* to be printed with his own commentary upon part of the Apocalypse. In 1609, he was elected master of Baliol college; which trust he discharged with the utmost care and assiduity, by his frequent lectures to the scholars, by his continual presence at public exercises, and by promoting temperance in the society. In November 1610, he was made prebendary of Normanton in the church of Southwell; and, in 1612, his Majesty appointed him regius professor of divinity at Oxford. The fame of his lectures became very great; and those which he gave upon the supreme power of kings against Bellarmine and Suarez, so much pleased his Majesty, that, when the see of Salisbury became vacant, he named him to that bishoprick, and he was consecrated by his own brother at Lambeth, December 3, 1615. When he came to Salisbury, he found the cathedral running to decay, through the negligence and covetousness of the clergy belonging to it; however, he found means to draw five hundred pounds from the prebendaries, which he applied to the reparation of this church. He then gave himself up to the duties of his function with great diligence and assiduity, visiting his whole diocese in person, and preaching every Sunday whilst health would permit. But this was not long: for his sedentary life, and close application to study, brought upon him the gravel and stone; of which he died on the 2d of March 1618, in the fifty-eighth year of his age; having not filled the see quite two years and three months, and being one of the five bishops which Salisbury had in six years. He was buried opposite to the bishop's seat in the cathedral. Dr Fuller *, speaking of the two brothers, says, "that George was the more plausible preacher, Robert the greatest scholar; George the abler statesman, Robert the deeper divine; gravity did frown in George, and smile in Robert." He published several pieces; and also left behind him sundry manuscripts, which Dr Corbet made a present of to the Bodleian library.

ABBOTS BROMLEY, a town in Staffordshire, with a market on Tuesday. After the dissolution of

the monasteries, it was given to the Lord Paget; and has since been called Paget's Bromley, and is so denominated in the county map. But it retains its old name in the king's books, and is a discharged vicarage of 30*l.* clear yearly value. It likewise retains the old name with regard to the fairs; which are three, and all for horses and horned cattle. They are on the Thursday before Mid-lent Sunday, the 22^d of May, and 24th of August. It is six miles east of Stafford, seven north of Litchfield, and 128 north-west of London. W. Long. 1. 2. Lat. 52. 45.

ABBOTSBURY, a small town in Dorsetshire, with a market on Thursday; seven miles west of Weymouth, seven fourth-west of Dorchester, and a hundred and thirty-three west-by-south of London. The fair is on July the tenth, for sheep and toys. W. Long. 1. 17. Lat. 50. 40. The abbey near this town was founded by a Norman lady, about the year 1026; and Edward the Confessor and William the Conqueror were considerable benefactors to it.

ABBREVIATE of *Adjudications*, in Scots law, an abstract or abridgment of a decret of adjudication, which is recorded in a register kept for that purpose *.

* See *Law*,
Part III.
no cxxii. 5.

ABBREVIATION. See ABBREVIATURE.

ABBREVIATOR, in a general sense, a person who abridges any large book into a narrower compass.

ABBREVIATORS, a college of 72 persons in the chancery of Rome, who draw up the pope's briefs, and reduce petitions, when granted by him, into proper form for being converted into bulls.

ABBREVIATURE, or ABBREVIATION, properly signifies the substitution of a syllable or letter for a whole word: thus, M. stands for *manipulus*, a handful; and Cong. for *congius*, a gallon.

ABBREVIATURE, in a less proper sense, is used for any mark or character. See CHARACTER.

ABBUTALS, signify the buttings or boundings of land towards any point. Limits were anciently distinguished by artificial hillocks, which were called *butenlines*; and hence *butting*. In a description of the site of land, the sides on the breadth are more properly *adjacentes*, and those terminating the length are *abbutantes*; which, in old surveys, were sometimes expressed by *capitares*, to head, whence abbutals are now called *head-lands*.

ABCDARY, or ABCEDARIAN, an epithet given to compositions, the parts of which are disposed in the order of the letters of the alphabet: thus we say, Abcedarian psalms, lamentations, hymns, &c.

ABDALA, the son of Abdalmotheb, was the father of the prophet Mahomet.

ABDALMALEK, the son of Mirvan, and the 5th khalif of the race of the Omniads, surnamed *Rasch al Hegiarat*, i. e. the skinner of a stone, because of his extreme avarice; as also *Aboulzebab*, because his breath was said to be so poisonous as to kill all the flies which rested on his face. Yet he surpassed all his predecessors in power and dominion; for in his reign the Indies were conquered in the east, and his armies penetrated Spain in the west: he likewise extended his empire toward the south, by making himself master of Medina and Mecca. He began his reign in the 65 of the hegira, A. D. 648; reigned 15 years; and four of his sons enjoyed the khalifate one after another.

Abbots-
Bromley
i
Abdal-
malek.

* *Writers of
England; in
Survey.*

Abdalmelk

Abderia.

* See *Avenger*.

ABDALMELEK (Ben Zohar), an eminent physician, commonly called by the Europeans *Avenger* *.

ABDALMOTHEB, or ABDAL MATEEB, the son of Hahem, the father of Abdalla, and grandfather of Mahomet the prophet of the Mussulmans, was, it is said, of such wonderful comeliness and beauty, that all women who saw him became enamoured: which may have given occasion to that prophetic light, which, according to the Arabians, shone on the foreheads of him, his ancestors, and descendants; it being certain that they were very handsome and graceful men. He died when Mahomet, of whom he had taken peculiar care, was only 8 or 9 years old; aged, according to some, 110, and according to other writers 120.

ABDALONYMUS, or ABDOLONYMUS, (in classical history), of the royal family of Sidon, and descended from king Cinyras, was contented to live in obscurity, and get his subsistence by cultivating a garden, while Strato was in possession of the crown of Sidon. Alexander the Great having deposed Strato, inquired whether any of the race of Cinyras was living, that he might set him on the throne. It was generally thought that the whole race was extinct: but at last Abdalonymus was thought of, and mentioned to Alexander; who immediately ordered some of his soldiers to fetch him. They found the good man at work, happy in his poverty, and entirely a stranger to the noise of arms, with which all Asia was at that time disturbed; and they could scarcely persuade him that they were in earnest. Alexander was convinced of his high descent, by the dignity that appeared in his person; but was desirous of learning from him in what manner he bore his poverty. "I wish (said Abdalonymus) I may bear my new condition as well: These hands have supplied my necessities: I have had nothing, and I have wanted nothing." This answer pleased Alexander so much, that, besides giving him all that was Strato's, he augmented his dominions, and gave him a large present out of the Persian spoils.

ABDALS, in the Eastern countries, a kind of saints supposed to be inspired to a degree of madness. The word comes, perhaps, from the Arabic, *Abdallah*, the servant of God. The Persians call them *devanah khoda*, similar to the Latins way of speaking of their prophets and sibyls, *q. d. furentes deo*, raging with the god. They are often carried by excess of zeal, especially in the Indies, to run about the streets, and kill all they meet of a different religion; of which travellers furnish many instances. The English call this, *running a muk*, from the name of the instrument, a sort of pignard, which they employ on those desperate occasions. If they are killed, as it commonly happens, before they have done much mischief, they reckon it highly meritorious; and are esteemed, by the vulgar, martyrs for their faith.

ABDERA, a maritime town of Thrace, not far from the mouth of the river Nessus, on the east side; (Strabo.) The foundation thereof, according to Herodotus, was attempted to be laid by Timolus the Clazomenian; but he was forced by the Thracians to quit the design. The Teians undertook it, and succeeded; settling there, in order to avoid the insults of the Persians. —Several singularities are told of Abdera *. The grafs of the country round it was so strong, that such horses as eat of it ran mad. In the reign of Cassander king of

Macedon, this city was so pestered with frogs and rats, that the inhabitants were forced to quit it for a time. —The Abderites, or Abderitani, were very much derided for their want of wit and judgment: yet their city has given birth to several eminent persons; as, Protagoras, Democritus, Anaxarchus, Hecateus the historian, Nicænetus the poet, and many others, who were mentioned among the illustrious men. —In the reign of Lyfimachus, Abdera was afflicted for some months with a most extraordinary disease †: this was a burning fever, whose crisis was always on the seventh day, and then it left them; but it so distracted their imaginations, that they fancied themselves players. After this, they were ever repeating verses from some tragedy, and particularly out of the Andromeda of Euripides, as if they had been upon the stage; so that many of these pale, meager actors were pouring forth their tragic exclamations in every street. This delirium continued till the winter following; which was a very cold one, and therefore fitter to remove it. Lucian, who has described this disease, endeavours to account for it this manner: Archelaus, an excellent player, acted the Andromeda of Euripides before the Abderites, in the height of a very hot summer. Several had a fever at their coming out of the theatre; and as their imaginations were full of the tragedy, the delirium which the fever raised represented perpetually Andromeda, Perseus, Medusa, &c. and the several dramatic incidents, and called up the ideas of those objects, and the pleasure of the representation, so strongly, that they could not forbear imitating Archelaus's action and declamation: And from thence the fever spread to others by infection.

ABDEST, a Persian word, properly signifying the water placed in a basin for washing the hands; but is used to imply the legal purifications practised by the Mahometans before they enter on their religious ceremonies.

ABDIAS of Babylon, one of the boldest legend-writers, who boasted he had seen our Saviour, was one of the 72 disciples, had been eye-witness of the actions and prayers at the deaths of several of the apostles, and had followed into Persia St Simon and St Jude, who, he said, made him the first bishop of Babylon. His book entitled *Historia certaminis apostolici*, was published by Wolfgang Lazius, at Basil, 1551; and it as since borne several impressions in different places.

ABDICATION, the action whereby a magistrate, or person in office, renounces and gives up the same before the term of service is expired.

This word is frequently confounded with *resignation*; but differs from it, in that abdication is done purely and simply, whereas resignation is in favour of some third person. It is said to be a renunciation, quitting, and relinquishing, so as to have nothing further to do with a thing; or the doing of such actions as are inconsistent with the holding of it. On king James's leaving the kingdom, and abdicating the government, the lords would have had the word *desertion* made use of; but the commons thought it was not comprehensive enough, for that the king might then have liberty of returning.

ABDOMEN, in anatomy, is that part of the trunk of the body which lies between the thorax and the bottom of the pelvis. See *ANATOMY*, n° 349, &c.

ABDOMINALES, or ABDOMINAL FISHES, constitute

Abdera

Abdominales.

† Lucianus, *suomodo Hist. ite cons. v. a. d. us, initio.*

* Plinei lib. xxv. c. 8. hist. lib. xv. c. 2.

Abdon
Abelard.

stitute the IVth Order of the *Fourth Class* of Animals, in the Linnaean system. See *ZOOLOGY*, n° 10, d.

ABDON, one of the Levitical cities in the south of the tribe of Aser. (Joshua.)

ABDON, the son of Hillel, a Pirathonite, succeeded Elon, and judged Israel eight years.

ABDUCTION, a form of reasoning among logicians, which consists in drawing conclusions from certain and undeniable propositions.

ABDUCTION, in surgery, a species of fracture wherein the broken parts of the bone recede from each other.

ABDUCTOR, or ABDUCENT, in anatomy, a name given to several of the muscles on account of their serving to withdraw, open, or pull back, the parts to which they are fixed.

ABEL, second son of Adam and Eve, was a shepherd. He offered to God some of the firstlings of his flock, at the same time that his brother Cain offered fruits of the earth. God was pleased with Abel's oblation, but dissatisfied with Cain's; which so exasperated the latter, that he rose up against his brother and killed him. These are the only circumstances Moses relates of him; though, were we to take notice of the several particulars which curiosity has given birth to on this occasion, they would run to a very great length. But this will not be expected.—It is remarkable, that the Greek churches, who celebrate the feasts of every patriarch and prophet, have not done the same honour to Abel; his name is not to be found in any catalogue of saints or martyrs till the 10th century, nor even in the new Roman martyrology. However, he is prayed to with some other saints in several Roman litanies said for persons who lie at the point of death.

ABELARD (Peter), one of the most famous doctors of the twelfth century, was born at Palais near Nantz, in Britany; he was well learned in divinity, philosophy, and the languages; but was particularly distinguished by his skill in logic, and his fondness for disquisitions, which led him to travel into several provinces in order to give public proof of his acuteness in that science. After having baffled many antagonists, he read lectures in divinity with great applause at Paris; where he boarded with a canon whose name was Fulbert, and who had a very beautiful niece named Heloise. The canon ardently wished to see this young lady make a figure among the learned, and Abelard was made her preceptor: but instead of instructing her in the sciences, he taught her to love. Abelard now performed his public functions very coldly, and wrote nothing but amorous verses. Heloise proving with child, Abelard sent her to a sister of his in Britany, where she was delivered of a son. To soften the canon's anger, he offered to marry Heloise privately; and he was better pleased with the proposal than the niece; who, from a singular excess of passion, chose to be his mistress rather than his wife. She married, however; but used often to protest upon oath that she was single, which provoked the canon to use her ill. Upon this, Abelard sent her to the monastery of Argenteuil; where she put on a religious habit, but did not take the veil. Heloise's relations considering this as a second treachery, hired ruffians, who, forcing into his chamber in the dead of the night, emaculated him. This infamous treatment made him fly to the gloom of a cloister. He assumed the monastic habit in the abbey of St Dennis; but the dis-

orders of that house soon drove him from thence. He was afterwards charged with heresy; but after several persecutions for his religious sentiments, he settled in a solitude in the diocese of Troies, where he built an oratory, to which he gave the name of the Paraclet. He was afterwards chosen superior of the abbey of Ruis in the diocese of Vannes: when the nuns being expelled from the nunnery in which Heloise had been placed, he gave her his oratory; where she settled with some of her sister nuns, and became their prioress. Abelard mixed the philosophy of Aristotle with his divinity, and in 1140 was condemned by the council of Rheims and Sens. Pope Innocent II. ordered him to be imprisoned, his books to be burnt, and forbid him ever teaching again. However, he was soon after pardoned, at the solicitation of Peter the Venerable, who received him into his abbey of Clugny, where he led an exemplary life. He died in the priory of Marcellus at Chalons, April 21, 1142, aged sixty three. His corpse was sent to Heloise, who buried it in the Paraclet. He left several works: the most celebrated of which are those tender letters that passed between him and Heloise, with the account of their misfortunes prefixed; which have been translated into English, and one of them immortalized by the harmony of Mr Pope's numbers.

ABEL-TREE, or ABEL-TREE, an obsolete name for a species of the poplar. See *POPULUS*.

ABEL-BETH-MAACHA, called also *Abel-maim*, a town in the tribe of Naphthali, in the north of Canaan, towards Syria, where was a district called Maacha*.

ABELIANS, ABELOITES, or ABELONIANS, in church-history, a sect of heretics mentioned by St Austin †, which arose in the diocese of Hippo in Africa, and is supposed to have begun in the reign of Arcadius, and ended in that of Theodosius. Indeed it was not calculated for being of any long continuance. Those of this sect regulated marriage after the example of Abel; who, they pretended, was married, but died without ever having known his wife. They therefore allowed each man to marry one woman, but enjoined them to live in continence: and, to keep up the sect, when a man and woman entered into this society, they adopted a boy and a girl, who were to inherit their goods, and to marry upon the same terms of not begetting children, but of adopting two of different sexes.

ABELLA, anciently a town of Campania, near the river Clanus. The inhabitants were called Abellani, and said to have been a colony of Chalcidians. The nux Avellana, called also *Prænestina*, or the hazelnut, takes its name from this town, according to Macrobius. Now *Avella*.

ABELLINUM, anciently a town of the Hirpini, a people of Apulia; distant about a mile from the rivulet Sabbato, between Beneventum and Salerno. Pliny calls the inhabitants Abellinates, with the epithet Propoti, to distinguish them from the Abellinates Marli. Now *Avellino*. E. Long. 15. 20. Lat. 21.

ABEL-MEHOLA, the country of the prophet Elisha, situate in Manassah, on this side Jordan, between the valley of Jezred and the village Bethmaela in the plains of Jordan, where the Midianites were defeated by Gideon. Judges, vii. 22.

ABEL-MIZRAIM, called also the Threshing-floor of *Atad*; signifying the lamentation of the Egyptians; in allusion to the mourning for Jacob, Gen.

Abelard
Abel-
Mizraim.

* 1 Kin. xv.
2 Chro. xvi.

† Augustin.
de Her. c. 87.

Abermosch
||
Aberbro-
thick.

Gen. i. 3, 10, 11. Supposed to near Hebron. (Wells.) ABELMOSCH, or ABELMUSCH, in botany, the trivial name of a species of the hibiscus. See HIBISCUS. ABEL-SATTIM, or SATTIM, a town in the plains of Moab, to the N. E. of the Dead Sea, not far from Jordan, where the Israelites committed fornication with the daughters of Moab: So called, probably, from the great number of fitim-trees there.

ABEN EZRA (Abraham) a celebrated rabbi, born at Toledo in Spain, called by the Jews, The wise, great, and admirable Doctor, was a very able interpreter of the Holy Scriptures; and was well skilled in grammar, poetry, philosophy, astronomy, and medicine. He was also a perfect master of the Arabic. His principal work is, Commentaries on the Old Testament, which is much esteemed: these are printed in Bomberg's and Buxtorf's Hebrew Bibles. His style is clear, elegant, concise, and much like that of the Holy Scriptures: he almost always adheres to the literal sense, and every where gives proofs of his genius and good sense: he, however, advances some erroneous sentiments. The scarcest of all his books is entitled, *Iesud Mora*; which is a theological work, intended as an exhortation to the study of the Talmud. He died in 1174, aged 75.

ABEN MELLER, a learned rabbin, who wrote a commentary on the Old Testament in Hebrew, intitled *The Perfection of Beauty*. This rabbin generally follows the grammatical sense and the opinions of Kimchi. The best edition is that of Holland.

ABENAS, a town of France, in Languedoc and in the lower Vivarais, seated on the river Ardèche, at the foot of the Cevennes, 15 miles north-west of Viviers. E. Long. 4. 43. Lat. 44. 40.

ABENSPERG, a small town of Germany, in the circle and duchy of Bavaria, and in the government of Munich. It is seated on the river Abentz, near the Danube, 13 miles south-west of Ratibon, and 20 east of Ingolstadt. E. Long. 11. 38. Lat. 48. 45.

ABERAVON, a borough-town of Glamorgan-shire in Wales, governed by a portreeve. It had a market, which is now discontinued: the vicarage is discharged, and is worth 45 l. clear yearly value. It is seated at the mouth of the river Avon, 19 miles south-west of Cowbridge, 75 east of St David's, and 194 west of London. W. Long. 3. 21. Lat. 51. 40.

ABERBROTHICK, or ABERBROTH, one of the royal boroughs of Scotland, situated in the county of Angus, about forty miles N. N. E. of Edinburgh; its W. Long. being 2. 29. and N. Lat. 56. 36. It is seated on the discharge of the little river Brothie into the sea, as the name imports, *Aber* in the British implying such a situation. It is a small but flourishing place, well built, and still increasing. The town has been in an improving state for the thirty last years, and the number of inhabitants greatly augmented; which is owing to the introduction of manufactures. The number, at this time, is said to be about three thousand five hundred: these principally consist of weavers of coarse brown linens, and some sail-cloth; others are employed in making white and coloured threads: the remainder are either engaged in the shipping of the place, or in the necessary and common mechanic trades. The brown linens, or Ofnaburghs, were manufactured here before any encouragement was given by Government, or the linen company erected at Edin-

burgh. It appears from the books of the stamp-office in this town, that seven or eight hundred thousand yards are annually made in the place, and a small district round. Besides this export and that of thread, much barley and some wheat is sent abroad. The foreign imports are flax, flax-seed, and timber, from the Baltic. The coasting trade consists of coals from Borrowtownells, and lime from Lord Elgin's kilns in Fife.—At this place, in default of a natural harbour, a tolerable artificial one of piers has been formed, where, at spring-tides, which rise here fifteen feet, ships of two hundred tons can come, and of eighty at neap-tides; but they must lie dry at low water. This port is of great antiquity: there is an agreement yet extant between the abbot and the burghers of Aberbrothick, in the year 1194, concerning the making of the harbour. Both parties were bound to contribute their proportions; but the largest fell to the share of the former, for which he was to receive an annual tax payable out of every rood of land lying within the borough.—The glory of this place was the abbey, whose very ruins give some idea of its former magnificence. It was founded by William the Lion in 1178, and dedicated to our celebrated primate Thomas à Becket. The founder was buried here; but there are no remains of his tomb, or of any other, excepting that of a monk, of the name of Alexander Nicol. The monks were of the Tyronensian order; and were first brought from Kelfo, whose abbot declared those of this place on the first institution to be free from his jurisdiction. The last abbot was the famous Cardinal Beaton, at the same time archbishop of St Andrews, and, before his death, as great and absolute here as Wolsey was in England. King John, the English monarch, granted this monastery most uncommon privileges; for by charter, under his great seal, he exempted it *a teloniis et consuetudine* in every part of England, except London.

ABERCONWAY, or CONWAY, Caernarvonshire, North-wales; so called from its situation at the mouth of the river Conway. It is a large well-built town; but its cattle is now in ruins. It is governed by a mayor and two bailiffs, and has a market on Fridays. It is 229 measured miles from London. W. Lon. 3. 47. Lat. 53. 20.

ABERDEEN, the name of two cities in Scotland, called the *Old* and *New Towns*, situated on the German Ocean, in W. Long. 1. 40. and N. lat. 57. 19.

The Old Town lies about a mile to the north of the Old Town. new, at the mouth of the river Don, over which is a fine bridge, of a single arch, which rests at both sides on two rocks. The old town was formerly the seat of the bishop, and had a large cathedral commonly called *St Machers*. This two very antique spires, and one aisle, which is used as a church, are now the only remains of it. The bishoprick was founded in the time of David I. who translated it from Mortlich in Banffshire to this place. The cathedral had anciently two rows of stone pillars across the church, and three turrets; the steeple, which was the largest of these turrets, rested upon an arch, supported by four pillars. In this cathedral there was a fine library; but, about the year 1560, it was almost totally destroyed. But the capital building is the King's-college, on the south side of the town, which is a large and stately fabric.

Aberbro-
thick
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Aberdeen.

Aberdeen.

fabric. It is built round a square, with cloisters on the south side. The chapel is very ruinous within; but there still remains some wood-work of exquisite workmanship. This was preferred by the spirit of the principal at the time of the reformation, who armed his people and checked the blind zeal of the barons of the Mearns, who after stripping the cathedral of its roof, and robbing it of the bells, were going to violate this seat of learning. They shipped their sacrilegious booty, with an intention of expelling it to sale in Holland; but the vessel had scarcely gone out of port, but it perished in a storm with all its ill-gained lading. The steeple is vaulted with a double cross arch; above which is an imperial crown, supported by eight stone-pillars, and closed with a globe and two gilded crosses. In the year 1631 this steeple was thrown down by a storm, but was soon after rebuilt in a more stately form. This college was founded in 1494, by William Elphinstone bishop of this place, Lord Chancellor of Scotland in the reign of James III. and Lord Privy Seal in that of James IV. But James IV. claimed the patronage of it, and it has since been called the *King's College*. This college, and the Marishall-college in the New Town, form one university, called the *University of King Charles*. The library is large, but not remarkable for many curiosities. Hector Boethius was the first principal of the college; and sent for from Paris for that purpose, on an annual salary of forty marks Scots, at thirteen pence each. The square tower on the side of the college was built, by contributions from general Monk and the officers under him then quartered at Aberdeen, for the reception of students; of which there are about a hundred belonging to the college, who lie in it.

New Town.

The New Town is the capital of the shire of Aberdeen. For largeness, trade, and beauty, it greatly exceeds any town in the north of Scotland. It is built on a hill or rising ground, and lies on a small bay formed by the Dee, deep enough for a ship of 200 tons. It is about two miles in circumference, and contains 14000 souls, and about 3000 in the suburbs; but the whole number of inhabitants between the bridges Dee and Don, which includes both the Aberdeens, and the interjacent houses or hamlets, is estimated at 20,000. The buildings (which are of granite from the neighbouring quarries) are generally four stories high; and have, for the most part, gardens behind them, which gives it a beautiful appearance. On the high street is a large church, which formerly belonged to the Franciscans. This church was begun by Bp William Elphinstone; and finished by Gavinus Dunbar, Bishop of Aberdeen, about the 1500. Bp Dunbar is said likewise to have built the bridge over the Dee, which consists of seven arches. In the middle of Castle-street is an octagon building, with neat bas-reliefs of the kings of Scotland from James I. to James VII. The town-house makes a good figure, and has a handsome spire in the center. The grammar-school is a low but neat building. Gordon's hospital is handsome; in front is a good statue of the founder: it maintains fortyboys, who are apprenticed at proper ages. The infirmary is a large plain building, and sends out between eight and nine hundred cured patients annually. But the chief public building in the new town is the Marishall-college, founded by George Keith earl of

Marshall, in the year 1593; but since greatly augmented with additional buildings. There are about 140 students belonging to it. In both the Marishall and King's-college the languages, mathematics, natural philosophy, divinity, &c. are taught by very able professors. The convents in Aberdeen were: One of Mathurines, or of the order of the Trinity, founded by William the Lion, who died in 1214; another of Dominicans, by Alexander II.; a third of Oblervantines, a building of great length in the middle of the city, founded by the citizens and Mr Richard Vais, &c.; and a fourth of Carmelites, or White Friars, founded by Philip de Arbutnot in 1350.

Aberdeen
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Abergavenny.

Trad.

Aberdeen once enjoyed a good share of the tobacco trade; but was at length forced to resign it to Glasgow, which was so much more conveniently situated for it. At present, its imports are from the Baltic, and a few merchants trade to the West Indies and North America. Its exports are stockings, thread, salmon, and oatmeal. The first is a most important article, as appears by the following state of it. For this manufacture, 20,800 pounds worth of wool is annually imported, and 1600 pounds worth of oil. Of this wool is annually made 69,333 dozen pairs of stockings; worth, at an average, 1 *l.* 10 *s.* per dozen. These are made by the country-people, in almost all parts of this great county, who get 4 *s.* per dozen for spinning, and 14 *s.* per dozen for knitting; so that there is annually paid them 62,329 *l.* 14 *s.* There is, besides, about 2000 *l.* value of stockings manufactured from the wool of the county. The thread manufacture is another considerable article, though trifling in comparison of the woollen. The salmon-fisheries on the Dee and the Don are a good branch of trade. About 46 boats, and 130 men, are employed on the fish; and, in some years, 167,000 lb. of fish have been sent pickled to London, and about 930 barrels of salted fish exported to France, Italy, &c. The fishery on the Don is far less considerable.—Aberdeen, with Aberbrothick, Brechin, Montrose, and Inverchervie, returns one member to Parliament.

ABERDOUR, a small town in Fifeshire, Scotland, on the frith of Forth, about ten miles N. W. of Edinburgh. In old times it belonged to the Viponts; in 1126 was transferred to the Mortimers by marriage, and afterwards to the Douglasses. William, Lord of Liddesdale, furnished the *Flower of chivalry*, in the reign of David II. by charter conveyed it to James Douglas, ancestor of the present noble owner the Earl of Morton. The monks of Incheolm had a grant for a burial-place here from Allan de Mortimer, in the reign of Alexander III. The nuns, usually styled the poor *Clares*, had a convent at this place.

ABERFORD, a market-town in the west riding of Yorkshire, stands in a bottom; and is about a mile long, and indifferently well built. It is near a Roman highway, which is raised very high, and not far from the river Cock; between which and the town there is the foundation of an old castle still visible. The market-day is Wednesday, and it is 181 miles north-by-west from London. W. Long. 2. 45. Lat. 55. 52.

ABERGAVENNY, a large, populous, and flourishing town in Monmouthshire, seated at the confluence of the rivers Uffk and Gavenny. It has a fine bridge

Abernethy
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Alteration.

bridge over the Uke, consisting of fifteen arches; and being a great thoroughfare from the west part of Wales to Bath, Bristol, Gloucester, and other places, is well furnished with accommodations for travellers. It is surrounded with a wall, and had once a castle. It is governed by a bailiff, a recorder, and twenty-seven burgesses; has two markets, one on Wednesdays, and the other on Fridays; and carries on a considerable trade in flannels, which are brought hither for sale from the other parts of the county. Its fairs are on May 14, for lean horned cattle and sheep; on the first Tuesday after Trinity Sunday, for linen and woollen cloth; and on the 25th of September, for flannels, hogs, and horses. It is 142 miles distant from London. W. Long. 2. 45. Lat. 51. 50.

ABERNETHY (John), an eminent dissenting minister, was the son of Mr John Abernethy a dissenting minister in Colrairie, and was born on the 19th of October 1680. When about nine years of age, he was separated from his parents, his father being obliged to attend some public affairs in London; and his mother, to shelter herself from the mad fury of the Irish rebels, retiring to Derry, a relation who had him under his care, having no opportunity of conveying him to her, took him with him to Scotland; by which means he escaped the hardships he must have suffered at the siege of Derry, where Mrs Abernethy lost all her other children. He afterwards studied at the university of Glasgow, till he took the degree of master of arts; and, in 1708, he was chosen minister of a dissenting congregation at Antrim, where he continued above twenty years. About the time of the Bangorian controversy (for which, see HODLY), a dissension arose among his brethren in the ministry at Belfast, on the subject of subscription to the Westminster confession; in which he became a leader on the negative side, and incurred the censure of a general synod. Being in consequence deserted by the greatest part of his congregation, he accepted an invitation to settle in Dublin, where his preaching was much admired. He was distinguished by his candid, free, and generous sentiments; and died of the gout in Dec. 1746, in the sixtieth year of his age. He published a volume of sermons on the Divine Attributes; after his death a second volume was published by his friends; and these were succeeded by two other volumes on different subjects: all of which have been greatly admired.

ABERNETHY, a town in Strathern, a district of Perthshire, in Scotland. It is seated on the river Tay, a little above the mouth of the Erne. It is said to have been the seat of the Pictish kings; and was afterwards the see of an archbishop, since transferred to St Andrews. It is now greatly decayed.

ABERRATION, in astronomy, a small apparent motion of the fixed stars discovered by the late Dr Bradley. The discovery was made by accident in the year 1725, when Mr Molyneux and Dr Bradley began to observe the bright star in the head of *Draco*, marked γ by Bayer, as it passed near the zenith, with an instrument made by Mr Graham, in order to discover the parallax of the earth's annual orbit; and, after repeated observations, they found this star, about the beginning of March 1726, to be 20" more southerly than at the time of the first observation. It now indeed seemed to have arrived at its utmost limit southward; because, in

several trials made about this time, no sensible difference was observed in its situation. By the middle of April, it appeared to be returning back again toward the north; and, about the beginning of June, it passed at the same distance from the zenith as it had done in December, when it was first observed: in September following it appeared 39" more northerly than it was in March, just the contrary way to what it ought to appear by the annual parallax of the stars. This unexpected phenomenon perplexed the observers very much; and Mr Molyneux died before the true cause of it was discovered. After this, Dr Bradley, with another instrument more exact and accurately adapted to this purpose, observed the same appearances not only in that but many other stars; and, by the great regularity that appeared in a series of observations made in all parts of the year, the doctor was fully satisfied with regard to the general laws of the phenomena; and therefore endeavoured to find out the cause of them. He was already convinced, that the apparent motion of the stars was not owing, to a nutation of the earth's axis. The next thing that offered itself, was an alteration in the direction of the plumb line, with which the instrument was constantly rectified; but this, upon trial, proved insufficient. Then he had recourse to what refraction might do; but here also nothing satisfactory occurred. At last this acute astronomer found, that the phenomena in question proceeded from the progressive motion of light, and the earth's annual motion in its orbit: for he perceived, that if light was propagated in time, the apparent place of a fixed object would not be the same when the eye is at rest, as when it is moving in any other direction, than that of the line passing through the eye and object; and that, when the eye is moving in different directions, the apparent place of the object would be different *.

ABERRATION, in optics, is used to denote that error or deviation of the rays of light, when infected by a lens or speculum, whereby they are hindered from meeting or uniting in the same point. There are two species of the aberrations of rays, distinguished by their different causes; one arising from the figure of the glass or speculum, the other from the unequal refrangibility of the rays of light. This last species is sometimes called the Newtonian, from the name of its inventor *.

ABERYSTWITH, a market-town of Cardiganshire, in Wales, seated on the Ridal, near its confluence with the Ithwith, where it falls into the sea. It was formerly a walled town; and fortified with a castle, which is now in ruins; and the town itself is gone to decay, for there is scarce a hundred houses remaining. However, it is governed by a mayor and recorder; and sends one member to parliament. It is noted for its fishing trade, and has a good market on Mondays for corn and wool. Its distance from London is 199 miles west-fourth-west. W. Long. 4. 15. Lat. 52. 30.

ABESTA, the name of one of the sacred books of the Persian magi, which they ascribe to their great founder Zoroaster. The abesta is a commentary on two others of their religious books called *Zend* and *Pazend*; the three together including the whole system of the Ignicld, or worshippers of fire.

ABETTOR, a law-term, implying one who encourages another to the performance of some criminal action, or who is art and part in the performance itself.

Aberration
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Abettor.

* Vide
Phil. Transf.
nº 406.

* See Optics,
nº 19—22.

Abex
||
Abgar.

self. Treason is the only crime in which abettors are excluded by law, every individual concerned being considered as a principal. It is the same with *Art-and-part* in the Scots law.

ABEX, a country in High Ethiopia, in Africa, bordering on the Red Sea, by which it is bounded on the east. It has Nubia or Sennar on the north; Sennar and Abyssinia on the west; and Abyssinia on the south. Its principal towns are Suaquem and Arkeko. It is subject to the Turks, and has the name of the Beglerbeg of Habeleth. It is about five hundred miles in length and one hundred in breadth, and is a wretched country; for the heat here is almost insupportable, and the air is so unhealthy, that an European cannot stay long there without the utmost hazard of his life. It is very mountainous, inasmuch that there are many more wild beasts than men. There are forests, in which grow a great number of ebony trees.

ABEYANCE, in law, the expectancy of an estate. Thus if lands be leased to one person for life, with reversion to another for years, the remainder for years is an abeyance till the death of the lessee.

ABGAR, or ABGARUS, a name given to several of the kings of Edessa in Syria. The most celebrated of them is one who, it is said, was cotemporary with Jesus Christ; and who having a distemper in his feet, and hearing of Jesus's miraculous cures, requested him, by letter, to come and cure him. Eusebius*, who believed that this letter was genuine, and also an answer our Saviour is said to have returned to it, has translated them both from the Syriac, and asserts that they were taken out of the archives of the city of Edessa. The first is as follows: "Abgarus, prince of Edessa, to Jesus the holy Saviour, who hath appeared in the flesh in the confines of Jerusalem, greeting. I have heard of thee, and of the cures thou hast wrought without medicines or herbs. For I have heard thou makest the blind to see, the lame to walk, lepers to be clean, devils and unclean spirits to be expelled, such as have been long diseased to be healed, and the dead to be raised; all which when I heard concerning thee, I concluded with myself, That either thou wast a God come down from heaven, or the Son of God sent to do these things. I have therefore written to thee, beseeching thee to vouchsafe to come unto me, and cure my disease. For I have also heard that the Jews use thee ill, and lay snares to destroy thee. I have here a little city, pleasantly situated, and sufficient for us both. ABGARUS." To this letter, Jesus, it is said, returned an answer by Ananias, Abgarus's courier, which was as follows: "Blessed art thou, O Abgarus! who hast believed in me whom thou hast not seen; for the scriptures say of me, They who have seen me have not believed in me, that they who have not seen me, by believing, have life. But whereas thou writest to have me come to thee, it is of necessity that I fulfil all things here for which I am sent; and having finished them, to return to him that sent me: but when I am returned to him, I will then send one of my disciples to thee, who shall cure thy malady, and give life to thee and thine. Jesus." After Jesus's ascension, Judas, who is also named Thomas, sent Thaddæus one of the seventy to Abgarus; who preached the gospel to him and his people, cured him of his disorder, and

* Eccl. Hist.
lib. i. c. 13.

wrought many other miracles: which was done, says Eusebius, A. D. 43.—Though the above letters are acknowledged to be spurious by the candid writers of the church of Rome; several Protestant authors, as Dr Parker †, Dr Cave ‡, and Dr Grabe §, have maintained that they are genuine, and ought not to be rejected.

ABGILLUS (John), furnished Prefter John, was son to a king of the Frisii; and, from the austerities of his life, obtained the name of *Prefter* or *Priest*. He attended Charlemagne in his expedition to the Holy Land; but instead of returning with that monarch to Europe, it is pretended that he gained mighty conquests, and founded the empire of the Abyssines, called, from his name, the empire of Prefter John. He is said to have written the history of Charlemagne's journey into the Holy Land, and of his own into the Indies; but they are more probably trifling romances, written in the ages of ignorance.

ABIANS, anciently a people of Thrace, or (according to some authors) of Scythia. They had no fixed habitations; they led a wandering life. Their houses were waggon, which carried all their possessions. They lived on the flesh of their herds and flocks, on milk, and cheese, chiefly on that of mare's milk. They were unacquainted with commerce. They only exchanged commodities with their neighbours. They possessed lands; but they did not cultivate them. They assigned their agriculture to any who would undertake it, reserving only to themselves a tribute; which they exacted, not with a view to live in affluence, but merely to enjoy the necessaries of life. They never took arms but to oblige those to make good a promise to them by whom it had been broken. They paid tribute to none of the neighbouring states. They deemed themselves exempt from such an imposition; for they relied on their strength and courage, and consequently thought themselves able to repel any invasion. The Abians, we are told, were a people of great integrity. This honourable eulogium is given them by Homer. (Strabo.)

ABIATHAR, high-priest of the Jews, son to Abimelech, who had borne the same office and received David into his house. This so enraged Saul, who hated David, that he put Abimelech to death, and 81 priests; Abiathar alone escaped the massacre. He afterwards was high-priest; and often gave king David testimonies of his fidelity, particularly during Abimelech's conspiracy, at which time Abiathar followed David, and bore away the ark. But after this, conspiring with Adonijah, in order to raise him to the throne of king David his father; this so exasperated Solomon against him, that he divested him of the priesthood, and banished him, A. M. 3021, before Christ 1014.

ABIB, signifying an ear of corn, a name given by the Jews to the first month of their ecclesiastical year, afterwards called *Nisan*. It commenced at the vernal equinox; and according to the course of the moon, by which their months were regulated, answered to the latter part of our March and beginning of April.

ABIDING by writings, in Scots law: When a person founds upon a writing alleged to be false, he may be obliged to declare judicially, whether he will stand or abide by it as a true deed. As to the consequence of abiding by, or passing from, a false deed, see *LAW*, Part III. N^o clxxxv. 32.

ABIES, the Fir-tree, a genus of evergreens; the characters

Abgillus

Ables.

† Simon's
Crit. Hist. of
the N. Test.
part i. c. 3.

Dupin's
Hist. of the
Cen.
vol. ii. c. 6.

Sec also,
Jones's New
Method of
settling the
canonical au-
thority of the
N.T. vol. ii.
p. 7, &c.

† Deem-
str. of the law of
nature & the
Xian relig.

Preface, and
Pt. ii. p. 135.

|| Hist. Li-
ter. in Christ.

vol. i. p. 2, 3;
§ Spiegel.

Par. tom. i.
p. 4, 306.

et in Notis,
p. 319, 321,
326.

Abies,
the Fir-tree.

characters of which are, There are male and female flowers on the same tree; the male flowers have em-palements of four leaves without petals, many stamens, and naked summits. The female flowers are collected in a scaly cone, each scale covering two flowers having neither petals or stamens, with one pointal, and are each succeeded by a winged nut. The distinguishing character of this genus, is the leaves arising singly from their base; whereas the Pines have two or more arising from the same point.

The Fir has always been separated from the Pines by all writers on botany before Dr Linnæus; and were generally distinguished therefrom, by their leaves being produced singly on the branches; the leaves of the Pines being produced by pairs, threes, or fives, out of sheaths which surround their base. And as this distinction is now well known among the nursery-gardeners, it is much better to keep them separate, than to join them, with the cedar of Libanus and larch-tree, to the Pine, as the doctor has done, making them of one genus; especially as the culture of them is very different. See PINUS.

Species de-
scribed.

The following species are now in the British gardens.

1. Picea, or the silver or yew-leaved fir, grows naturally in many parts of Germany, but the finest trees of this sort are growing upon mount Olympus. The Strasburgh turpentine is drawn from this tree. The wood is white and soft, and therefore not greatly esteemed. 2. Alba, or the spruce or Norway fir, sometimes called the pitch-tree, grows naturally on the low lands of Sweden, Norway, and Denmark, or the mountains of Scotland; as also in many other parts of Europe. The wood is very light, white, rots in the air, and crackles in the fire. It is used for making musical instruments, packing-boxes, &c. The Laplanders make ropes of the roots, and employ them for fastening together the thin planks of their portable canoes. The inhabitants of Canada prepare a pleasant and wholesome liquor from the leaves. 3. Balsamea, or the balm-of-Gilead fir, so nearly resembles the picea, as scarcely to be distinguished from it after it is grown to a large size. 4. Canadensis, or the small-coned American spruce fir, grows naturally in many parts of North America, from whence the cones have been brought to England. The leaves are shorter than those of the spruce fir, but like them in shape; the cones are loose, and about an inch in length. 5. The Newfoundland spruce, is a native of Newfoundland and several other parts of North America; where the inhabitants make three sorts of it, by the titles of Black, White, and Red Spruce. 6. Americana, or the American hemlock fir, is also a native of the same country; and in the northern parts grows to be a very large tree: but in Britain the branches spread wide every way, so that there is no appearance of the trees ever arriving to any considerable height. The leaves are short, and shaped very like those of the yew-tree: they are ranged on two sides of the branches only; so they appear flat, like those of the silver fir; but are of a pale green on both sides. The cones are small, loose, and roundish. From most of these firs, the inhabitants of North America collect a clear fragrant turpentine, which they use for curing green wounds; and the physicians there make great use of it internally.

Culture. All the sorts of fir are propagated by seeds. The

Abies,
the Fir-tree.

time for sowing them is about the middle of March, when the season is mild; otherwise it had better be deferred till the end of that month, or the beginning of April. The seeds which are preferred in their cones, will keep good much longer than those which are taken out: but the cones of the silver and balm-of-Gilead firs generally fall to pieces in the autumn, soon after the seeds are ripe; so that if they are not carefully watched, and gathered at that time, the seeds will be lost. The cones of all the sorts of fir open with more ease than those of the pines, and require but little trouble to get out their seeds. If they are spread on a cloth before a fire for a few hours, their scales will open and emit the seeds. They may be sown in pots or boxes filled with light fresh earth, and covered over about half an inch thick with the same earth: these should be placed to an east aspect, where they may have the sun till eleven in the morning. Or if the seeds are sown in a bed of earth, it should be shaded with mats in the middle of the day: for when they are too much exposed to the sun, the surface of the ground will dry so fast (especially in dry seasons) as to hinder the seeds from vegetating; and when the plants begin to appear, if they are not screened from the sun, many of them will be soon destroyed. The seeds must be carefully guarded against mice and birds, who are very fond of them, but particularly when the plants begin to appear; for as they thrust up the cover of the seeds on their top, the birds, in pecking off these covers, destroy the young plants: therefore the surest method is to cover them with nets until the plants have thrown off their husks and expanded their seed-leaves, soon after which they will be out of danger. After the plants have remained in the seed-bed one year, they may be transplanted into beds in rows at five or six inches distance, and the plants in the rows four inches asunder. They must be carefully weeded; and, if the season proves very dry, it will be of service gently to sprinkle them over with water once or twice a-week during the hot time of the year. When they have grown two years in these beds, they may then be transplanted into the nursery, placing them in rows at three feet distance, and in the rows a foot asunder. The best season for removing them is in April, just before they begin to shoot. The smaller these trees are planted out where they are to remain, the greater will be their progress, and they will grow to a much larger size than those that are removed at a much greater age.—The wood of all the sorts of fir yet known, being much inferior to that of the Pine*, it is not common to make plantations of them for their timber, but to cultivate them in pleasure-grounds for ornament. With this view, they should be placed so far asunder as to admit the free air between them; otherwise the lower branches will decay, and render the trees unsightly. The great beauty of these trees is their pyramidal form, and their being furnished with lateral branches from about seven feet above the surface of the ground to the top. These branches should be well garnished with leaves: to obtain which, the trees should not be planted nearer than 18 or 20 feet; for when they are closer planted, the under branches soon drop their leaves, and totally decay. The unskilful disposition of these trees has brought them into disrepute with many persons; whereas, if properly placed, they may be made

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Abigeat
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Abingdon.

made very ornamental to fine feats.—In pruning off the under branches to the designed height, there must be care taken not to cut off too many at the same time; one tier being enough to be displaced in a year. The best time for this operation is in the beginning of September.—The American spruce-fir, planted in light moist ground, grow to a large size, and make a beautiful appearance; and if they are allowed room for their lower branches to spread and extend, they will be garnished with them almost to the ground, forming themselves in a pyramidal figure.—For the medical uses of certain species of the Abies, see MATERIA MEDICA, n° 61.

ABIGEAT, an old law-term, denoting the crime of stealing cattle by droves or herds. This crime was more severely punished than *furtum*, the delinquent being often condemned to the mines, banishment, and sometimes capitally.

ABIHU, brother to Nadab, and son to Aaron. The two former had the happiness to ascend mount Sinai with their father, and there to behold the glory of God; but afterward putting strange fire into their censers, instead of the sacred fire commanded by God, fire rushing upon them killed them. Though all the people bewailed this terrible catastrophe, Moses forbade Aaron and his two sons Eleazar and Ithamar to join in the lamentation.

ABILITY, a term in law, denoting a power of doing certain actions in the acquisition or transferring of property.

ABIMELECH, king of Gerar, a country of the Philistines, cotemporary with Abraham. This patriarch and his family being there, his wife Sarah, though 90 years of age, was not safe in it; for Abimelech carried her off, and was so enamoured of her, that he resolved to marry her. Abraham did not declare himself Sarah's husband; but gave out she was his sister. But the king being warned in a dream, that she was married to a prophet, and that he should die if he did not restore her to Abraham, the king obeyed: at the same time reproving Abraham for his dissimulation; who thereupon, among other excuses, said she was really his sister, being born of the same father, tho' of a different mother. Abimelech afterwards gave considerable presents to Abraham; and a covenant, that of Beerseba, was entered into between them.—After the death of Abraham, there being a famine in the neighbouring countries, Isaac his son also withdrew into Gerar, which was then likewise governed by a king called

ABIMELECH, probably the successor of the former. Here Rebekah's beauty forced her husband to employ Abraham's artifice. Abimelech discovering that they were nearer related, chid Isaac for calling his wife his sister; and, at the same time, forbid all his subjects, upon pain of death, to do the least injury to Isaac or Rebekah.—Isaac's prosperity lost him the king's friendship, and he was desired to go from among them. He obeyed; but Abimelech afterward entered into a covenant with him.

ABIMELECH, the natural son of Gideon, by Druma his concubine. His violent acts and death are recorded in Judges, chap. ix.

ABINGDON, a market-town in Berkshire, seated on a branch of the Thames, received its name from an abbey anciently built there. The streets, which are well paved, centre in a spacious area, in which the

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Abingdon
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Abblactation.

market is held; and in the centre of this area is the market-house, which is supported on lofty pillars, with a large hall of free-stone above, in which the summer-azizes for the county are held, and other public business done, the Lent azizes being held at Reading. It has two churches; one dedicated to St Nicholas, and the other to St Helena: the latter is adorned with a spire, and both are said to have been erected by the abbots of Abingdon. Here are also two hospitals, one for six, and the other for thirteen poor men, and as many poor women; a free school; and a charity-school. The town was incorporated by queen Mary; and is governed by a mayor, two bailiffs, and nine aldermen: it sends two members to parliament, who are chosen by the inhabitants at large not receiving alms. Its great manufacture is malt, large quantities of which are sent by water to London. The market-days are on Monday and Friday; and it hath four fairs for horses and other cattle, on the first Monday in Lent, on June 20, on September 19, and on December 11. It is six miles and a half south of Oxford, forty-seven east of Gloucester, and fifty-five west of London. Long. 1. 20. Lat. 51.

AB-INTESTATE, in the civil law, is applied to a person who inherits the right of one who died intestate or without making a will. See INTESTATE.

ABIRAM, a feditious Levite, who, in concert with Korah and Dathan, rebelled against Moses and Aaron, in order to share with them in the government of the people; when Moses ordering them to come with their censers before the altar of the Lord, the earth suddenly opened under their feet, and swallowed up them and their tents; and at the same instant fire came from heaven, and consumed two hundred and fifty of their followers. Numb. xvi.

ABISHAI, son of Zeruiah, and brother to Joab, was one of the celebrated warriors who flourished in the reign of David: he killed with his own hand three hundred men, with no other weapon but his lance; and slew a Philistine giant, the iron of whose spear weighed three hundred shekels. 1 Sam. xxvi. 2 Sam. xxiii.

ABJURATION, in our ancient customs, implied an oath, taken by a person guilty of felony, and who had fled to a place of sanctuary, whereby he solemnly engaged to leave the kingdom for ever.

ABJURATION, is now used to signify the renouncing, disclaiming, and denying upon oath, the Pretender to have any kind of right to the crown of these kingdoms.

ABJURATION of *heresy*, the solemn recantation of any doctrine as false and wicked.

ABLACTATION, or weaning a child from the breast. If the mother or nurse has enough of milk, a child will need little or no other food before the second or third month of its age; when it will be proper to give it, once or twice a-day, a little water-pap; and as it grows older, it may be fed oftener, and have its panada sometimes mixed with milk. This will accustom the child by degrees to take food, and will render the weaning both less difficult and less dangerous. Weaning, unless when silents, weakness, or such like circumstances, forbid, ought generally to take place about the sixth or seventh month, at farthest by the ninth or tenth. The child ought then to be fed four or five times a-day; but should never be accustomed to eat in the night. The food should be simple

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and light; not spoiled with sugar, wine, and such like additions, for they produce the diseases that children are most troubled with. Unfermented flour makes a viscid food that turns four before it digests, and well fermented bread soon turns four; but if the panada made of this latter be given new, the inconvenience of souring is prevented. To prevent acidity in the child's stomach by a daily use of vegetable food, give now and then a little fresh broth, made from either veal, mutton, or beef. Rice is not so apt to turn four as wheat bread is; it therefore would be a more convenient food for children, and deserves to be attended to. Toasted bread boiled in water till it is almost dry, then mixed with fresh milk not boiled, is an agreeable change. As the teeth advance, the diet may increase in its solidity. As to the quantity, let the appetite be the measure of it; observing to satisfy hunger, but no more; which may be thus managed, Feed the child no longer than he eats with a degree of eagerness: but children may at all times be allowed good light bread to chew as much as they please. Butter ought by all means to be denied them; as it both relaxes the stomach, and produces gross humours. In place of this, let them be used as early as possible with honey; which is cooling, cleansing, tends to sweeten the humours, prevents or destroys worms, and renders children less subject to scabbed head and other cutaneous disorders. In feeding, let the child be held in a sitting posture, and that until the stomach has nearly digested its contents; the too common practice of violently dancing and shaking the child should be avoided. Divert it during the day as much as possible, which will make it sleep soundly all the night. Never awaken a child when it is asleep, for thus fickleness and peevishness are often produced.

* See Grafting.

ABLACTION, among the ancient gardeners, the fame with what is called *grafting by approach* *.

ABLAÏ, a country of Great Tartary, the inhabitants of which, called Buchars or Buchares, are subject to Russia, but that only for protection. It lies eastward of the river Irty, and extends five hundred leagues along the southern frontiers of Siberia.

ABLAQUEATION, an old term in gardening, signifies the operations of removing the earth and baring the roots of trees in winter, to expose them more freely to the air, rain, snows, &c.

ABLATIVE, is the 6th case in Latin grammar, and peculiar to that language. It is opposed to the dative, which expresses the action of *giving*, the ablative expressing that of *taking away*.

ABLECTI, in Roman antiquity, a select body of soldiers chosen from among those called *Extraordinarii* *.

ABLEGMINA, in Roman antiquity, those choice parts of the entrails of victims, which were offered in sacrifice to the gods. They were sprinkled with flour, and burnt upon the altar; the priests pouring some wine on them.

ABLUMENTS, in medicine, the same with diluters. **ABLUTION**, in a general sense, signifies the washing or purifying something with water.

ABLUTION, in a religious sense, a ceremony in use among the ancients, and still practised in several parts of the world: it consisted in washing the body, which was always done before sacrificing, or even entering their houses.—Ablutions appear to be as old as any ceremonies, and external worship itself. Moses enjoined them;

the heathens adopted them; and Mahomet and his followers have continued them: thus they have got footing among most nations, and make a considerable part of most established religions. The Egyptian priests had their diurnal and nocturnal ablutions; the Grecians their sprinklings; the Romans their lustrations and lavations; the Jews their washing of hands and feet, beside their baptisms. The ancient Christians had their ablutions before communion; which the Romish church still retain before their mass, sometimes after: the Syrians, Copts, &c. have their solemn washings on Good-Friday: the Turks their greater and lesser ablutions; their Ghaht and Wodou, their Aman, Taharat, &c.

ABNER, the son of Ner, father-in-law to Saul, and general of all his forces, who served him on all occasions with fidelity and courage. After the death of that prince, Abner set Ishbosheth, Saul's son, on the throne. A war breaking out between the tribe of Judah who had elected David king, and Israel, Abner marched against that prince with the flower of his troops, but was defeated. Abner afterward, being disguised, went over to David, and disposed the chiefs of the army and the elders of Israel to declare for him; and was received by David with such testimonies of affection, as gave umbrage to Joab, who killed him traitorously.

ABNOBA, now **ABENOW**, a long range of mountains in Germany, taking different names according to the different countries they run through. As about the river Maine, called the *Oden* or *Ottenwald*; between Hesse and Franconia, the *Spessart*; and about the duchy of Wirtemberg, where the Danube takes its rise, called the *Boar*.

ABO, a maritime town in Sweden: it is the capital of the province of Finland, and is seated in the gulph of that name, at the mouth of the river Aurala. It is a good port; and is the see of a bishop, suffragan of Upsal. It has also an university, founded by queen Christina in 1640. It lies 120 miles north-east from Stockholm. E. Long. 21. 28. Lat. 60. 50.

ABOARD, the inside of a ship. Hence any person who enters a ship is said to *go aboard*: but when an enemy enters in the time of battle, he is said to *board*; a phrase which always implies hostility.—To *fall aboard of*, is to strike or encounter another ship when one or both are in motion, or to be driven upon a ship by the force of the wind or current.—*Aboard-main-tack*, the order to draw the main-tack, i.e. the lower corner of the main-sail, down to the chefs-tree. See **CHEFS-TREE**.

ABOLITION, implies the act of annulling, destroying, making void, or reducing to nothing. In law, it signifies the repealing any law or statute.

ABOLLA, a warm kind of garment, lined or doubled, worn by the Greeks and Romans, chiefly out of the city, in following the camp.—Critics and antiquaries are greatly divided as to the form, use, kinds, &c. of this garment. Papias makes it a species of the toga, or gown; but Nonius, and the generality, a species of the pallium, or cloak. The *abolla* seems rather to have stood opposed to the *toga*, which was a garment of peace, as the *abolla* was of war; at least Varro and Martial place them in this opposite light. There seem to have been different kinds of *abollas*, fitted to different occasions. Even kings appear to have used the *abolla*: Caligula was affronted at king Ptolemy for appearing

Ablution
—
Abolla.

appearing

Abomasus | peering at the shews in a purple abolla, and by the eclat
| thereof turning the eyes of the spectators from the emper-
Aborigines | tor upon himself.

* See Com-
parative A-
natomy,
pp 88, 89,
90.

ABOMASUS, ABOMASUM, or ABOMASIVS, names of the fourth stomach of ruminating animals*.

ABOMINATION, a term used in scripture with regard to the Hebrews, who, being shepherds, are said to have been an abomination to the Egyptians, because they sacrificed the sacred animals of that people, as oxen, goats, sheep, &c. which the Egyptians esteemed as abominations, or things unlawful. The term is also applied in the sacred writings to idolatry and idols, because the worship of idols is in itself an abominable thing, and at the same time ceremonies observed by idolaters were always attended with licentiousness and other odious and abominable actions. The *abomination of desolation*, foretold by the prophet Daniel, is supposed to imply the statue of Jupiter Olympius, which Antiochus Epiphanes caused to be placed in the temple of Jerusalem. And the *abomination of desolation*, mentioned by the Evangelists, signifies the ensigns of the Romans, during the last siege of Jerusalem by Titus, on whom the figures of their gods and emperors were embroidered, and placed upon the temple after it was taken.

ABON, ABONA, or ABONIS, (Antonie;) a town and river of Albion. The town, according to Camden, is Abington; and the river Abhon or Avon. But by Antonine's Itinerary, the distance is nine miles from the Venta Silurum, or Caer-Went: others, therefore, take the town to be Porflut, at the mouth of the river Avon, over against Bristol. Abhon or Avon, in the Celtic language, denotes a river.

ABOR, CHABOR, or HABOR, a district in Assyria, on the river Gozan, bounding on Media, 2 Kings xvii.

ABORIGINES, (Dionysius of Halicarnassus, Livy, Virgil;) originally a proper name, given to a certain people in Italy, who inhabited the ancient Latium, or country now called *Campagna di Roma*. In this sense the Aborigines are distinguished from the Janigenæ, who, according to the false Berofus, inhabited the country before them; from the Siculi, whom they expelled; from the Grecians, from whom they descended; from the Latins, whose name they assumed after their union with Æneas and the Trojans; lastly, from the Ausonii, Volsci, Oenotrii, &c. neighbouring nations in other parts of the country.—Whence this people came by the appellation, is much disputed. St Jerom says, they were so called as being, *absque origine*, the primitive planters of the country after the flood: Dion. of Halicarnassus accounts for the name, as denoting them the founders of the race of inhabitants of that country: others think them so called, as being originally Arcadians, who claimed to be earth-born, and not descended from any people. Aurelius Victor suggests another opinion, *viz.* that they were called *Aborigines*, q. d. *Aberigines*, from *ab*, from, and *errare*, to wander; as having been before a wandering people. Pausanias rather thinks they were thus called *απο γης*, from *mountains*; which opinion seems confirmed by Virgil, who, speaking of Saturn, the legislator of this people, says,

*Is genus indocile ad dispersum montibus altis
Composuit, legesque dedit.*—

The Aborigines were either the original inhabitants of the country, settled there by Janus, as some imagine; or by Saturn, or Cham, as others; not long after the dispersion, or even, as some think, before it: or they were a colony sent from some other nation; who expelling the ancient inhabitants the Siculi, settled in their place.—About this mother-nation there is great dispute. Some maintain it to be the Arcadians, parties of whom were brought into Italy at different times; the first under the conduct of Oenotrius, son of Lyacon, 450 years before the Trojan war; a second from Theffaly; a third under Evander, 60 years before the Trojan war: besides another under Hercules; and another of Lacedæmonians, who fled from the severe discipline of Lycurgus: all these uniting, are said to have formed the nation or kingdom of the Aborigines. Others will have them of barbarian rather than Grecian origin, and to have come from Scythia; others from Gaul. Lastly, others will have them to be Canaanites, expelled by Joshua.

ABORTION, in midwifery, the birth of a fœtus before it has acquired a sufficient degree of perfection to enable it to perform respiration and the other vital functions*.

The practice of procuring abortions was prohibited by the ancient Greek legislators Solon and Lycurgus. Whether or not it was permitted among the Romans, has been much disputed. It is certain the practice, which was by them called *viferibus vim inferre*, was frequent enough: but whether there was any penalty on it, before the emperors Severus and Antonine, is the question. Noodt maintains the negative; and further, that those princes only made it criminal in one particular case, *viz.* of a married woman's practising it out of resentment against her husband, in order to defraud him of the comfort of children: this was ordered to be punished by a temporary exile. The foundation on which the practice is said to have been allowed, was, that the fœtus, while *in utero*, was reputed as a part of the mother, ranked as one of her own viscera, over which she had the same power as over the rest: besides, that it was not reputed as a man, *homo*; nor to be alive, otherwise than as a vegetable: consequently, that the crime amounted to little more than that of plucking unripe fruit from the tree. Seneca represents it as a peculiar glory of Helvia, that she had never, like other women, whose chief study is their beauty and shape, destroyed the fœtus in her womb. The primitive fathers, Athenagoras, Tertullian, Minutius Felix, Augustin, &c. declaimed loudly against the practice as virtual murder. Several councils have condemned it. Yet we are told that the modern Romish ecclesiastical laws allow of dispensations for it. Egan mentions the rates at which a dispensation for it may be had.—In some countries, the procuring of abortions is still said not only to be allowed, but even enjoined by law; as among the Formosans, if Mr Psalmanazar had been to be believed, who relates, that the women there, tho' married, are not allowed to breed before 35 years of age. When with child before that time, they are obliged to make themselves abortive by force: to this end the priests (for in that country, according to him, the priestly office belongs to women) tramples on the patient's belly, till she bring forth. But the extraordinary fabrications of this author are now well known*.

* For the treatment, of Abortions, see *Midwifery*, p 125.

* See *Psalmazar*.
The

Abortion
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Abraca-
dabra.

The practice of artificial abortion is chiefly in the hands of women and nurses, rarely in that of physicians; who, in some countries, are not admitted to the profession without abjuring it. Hippocrates, in the oath he would have enjoined on all physicians, includes their not giving the *passus abortivus*: though elsewhere he gives the formal process whereby he himself procured in a young woman a miscarriage. In the Supplement to Chambers's Dictionary, a detail is given of the various methods by which abortions may be procured. But we were unwilling to bestow room upon information which it seemed equally useless and improper to propagate. It may, however, be observed, that often all the powers of art prove ineffectual, and no less often do the attempts prove the means of punishment by the fatal consequences which they produce.

ABORTION, among gardeners, signifies such fruits as are produced too early, and never arrive at maturity.

ABORTIVE, is, in general, applied to whatever comes before its legitimate time, or to a design which miscarries.

ABOU-NAVAS, an Arabian poet of the first class, was born at Balfora; and flourished at the court of Aaron al Rafchid, at the end of the 7th century.

ABOUT, the situation of a ship immediately after she has *tacked*, or changed her course by going about and standing on the other tack*.—*About-ship!* the order to the ship's crew to prepare for tacking.

ABOUTIGE, a town in Upper Egypt, in Africa, near the Nile, where they make the best oilum in all the Levant. It was formerly a large, but now is a mean place. N. lat. 26. 50.

ABRA, a silver coin struck in Poland, and worth about one shilling Sterling. It is current in several parts of Germany, Constantinople, Africain, Smyrna, and Grand Cairo.

ABRABANEL, ABRABANEL, or AVRAVANEL, (Isaac) a celebrated rabbi, descended from king David, and born at Lisbon A. D. 1437. He became counsellor to Alphonso V. king of Portugal, and afterwards to Ferdinand the Catholic; but in 1492 was obliged to leave Spain with the other Jews. In short, after residing at Naples, Coriout, and several other cities, he died at Venice in 1508, aged 71. Abrabanel passed for one of the most learned of the rabbis; and the Jews gave him the names of the Sage, the Prince, and the Great Politician. We have a Commentary of his on all the Old Testament, which is pretty scarce: he there principally adheres to the literal sense; and his style is clear, but a little diffuse. His other works are, A Treatise on the Creation of the World; in which he refutes Aristotle, who imagined that the world was eternal: A Treatise on the explication of the prophecies relating to the Messiah, against the Christians: A book concerning articles of Faith; and some others less sought after. Though Abrabanel discovers his aversion to Christianity, yet in all his writings he treats the Christians with politeness and good-manners.

ABRACADABRA, a magical word, recommended by Serenus Samonicus as an antidote against agues and several other diseases. It was to be written upon a piece of paper as many times as the word contains letters, omitting the last letter of the former every time, as in the margin†, and repeated in the same order; and then suspended about the neck by a linen thread. *Abracada-*

bra was the name of a god worshipped by the Syrians; Abrabam. so wearing his name was a sort of invocation of his aid: a practice which, though not more useful, yet was less irrational, than is the equally heathenish practice among those who call themselves Christians, of wearing various things, in expectation of their operating by a Sympathy, whose parents were Ignorance and Superstition.

ABRAHAM, the father and stock whence the faithful sprung, was the son of Terah. He was descended from Noah by Shem, from whom he was nine degrees removed. Some fix his birth in the 130th year of Terah's age, but others place it in his father's 70th year. It is highly probable he was born in the city of Ur, in Chaldea, which he and his father left when they went to Canaan, where they remained till the death of Terah; after which, Abraham resumed his first design of going to Palestine. The Scriptures mention the several places he stopped at in Canaan; his journey into Egypt, where his wife was carried off from him; his going into Gerar, where Sarah was again taken from him, but restored as before; the victory he obtained over the four kings who had plundered Sodom; his compliance with his wife, who insisted that he should make use of their maid Hagar in order to raise up children; the covenant God made with him, sealed with the ceremony of circumcision; his obedience to the command of God, who ordered him to offer up his only son as a sacrifice, and how this bloody act was prevented; his marriage with Keturah; his death at the age of 175 years; and his interment at the cave of Macpelah, near the body of Sarah his first wife. It would be of little use to dwell long upon these particulars, since they are so well known. But tradition has supplied numberless others, the mention of one or two of which may not be unacceptable.

Many extraordinary particulars have been told relating to his conversion from idolatry. It is a pretty general opinion, that he sucked in the poison with his milk; that his father made statues, and taught that they were to be worshipped as gods*. Some Jewish authors relate†, that Abraham followed the same trade with Terah for a considerable time. Maimonides‡ says, that he was bred up in the religion of the Sabaeans, who acknowledged no deity but the stars; that his reflections on the nature of the planets, his admiration of their motions, beauty, and order, made him conclude there must be a being superior to the machine of the universe, a being who created and governed it; however, according to an old tradition, he did not renounce paganism till the 50th year of his age. It is related§, that his father, being gone a journey, left him to sell the statues in his absence; and that a man, who pretended to be a purchaser, asked him how old he was. Abraham answered, "Fifty."—"Wretch that thou art, (said the other), for adoring, at such an age, a being which is but a day old!" These words greatly confounded Abraham. Some time afterwards, a woman brought him some flour, that he might give it as an offering to the idols; but Abraham, instead of doing so, took up a hatchet and broke them all to pieces, excepting the largest, into the hand of which he put the weapon. Terah, at his return, asked whence came all this havoc? Abraham made answer, that the statues had had a great contest which should eat first of the oblation; "Upon which, (said he),

* Suidas, in *Septuag.* See *Jos. xxiv. 2.*
† Apud Genebrand, in *Chron.*
‡ More No-
voch. c. 29.

§ Heidegger. *Hist. Patri-
arch. tom.*
iii. p. 36.

†
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Abraham-
ites.

he), the god you see there, being the stoutest, hewed the others to pieces with that hatchet." Terah told him this was bantering; for those idols had not the sense to act in this manner. Abraham retorted these words upon his father against the worshipping of such gods. Terah, stung with this railery, delivered up his son to the cognizance of Nimrod, the sovereign of the country: who exhorted Abraham to worship the fire; and, upon his refusal, commanded him to be thrown into the midst of the flames: "Now let your God (said he) come and deliver you:" But (adds the tradition), Abraham came safe and found out of the flames.—This tradition is not of modern date, since it is told by St Jerom *; who seems to credit it in general, but disbelieves that part of it which makes Terah so cruel as to be the informer against his own son. Perhaps the antiquity of the word *Ur* § might have given rise to the fiction altogether. Such as lay it stress on the following words which God says to Abraham, (Gen. xv. 7.), *I am the Lord that brought thee out of Ur of the Chaldees*, imagine that he saved him from Eridras ix. a great perfection, since he employed the very same words in the beginning of the decalogue to denote the deliverance from Egypt.

Abraham is said to have been well skilled in many sciences, and to have wrote several books. Josephus * tells us that he taught the Egyptians arithmetic and geometry; and, according to Eupolemus and Artapan, he instructed the Phenicians, as well as the Egyptians, in astronomy. A work which treats of the creation has been long ascribed to him; it is mentioned in the Talmud †, and the Rabbis Chanina and Hofchafia used to read it on the eve before the sabbath. In the first ages of Christianity, according to St Epiphanius ‡, a heretical sect, called Sethinians, dispersed a piece which had the title of *Abraham's Revelation*. Origen mentions also a treatise supposed to be wrote by this patriarch. All the several works which Abraham composed in the plains of Mamre, are said to be contained in the library of the monastery of the Holy cross on Mount Amaria, in Ethiopia §. The book on the creation was printed at Paris 1552, and translated into Latin by Postel; Rittangel, a converted Jew, and professor at Konigsberg, gave also a Latin translation of it, with remarks, in 1642.

ABRAHAM BEN MEIR, or ABEN EZRA. See ABEN EZRA.

ABRAHAM USQUE, a Portuguese Jew, who translated the Bible out of Hebrew into Spanish. It was printed at Ferrara in 1553, and re-printed in Holland in 1630. This Bible, especially the first edition, which is most valuable, is marked with stars at certain words, which are designed to shew that these words are difficult to be understood in the Hebrew, and that they may be used in a different sense.

ABRAHAM (Nicholas), a learned Jesuit born in the diocese of Toul, in Lorrain, in 1589. He obtained the rank of divinity professor in the university of Pont-a-Mousson, which he enjoyed 17 years, and died September 7, 1655. He wrote Notes on Virgil and on Nonnius; A Commentary on some of Cicero's Orations, in 2 vols folio; An excellent collection of theological pieces, in folio, entitled *Pharus Veteris Testamenti*; and some other works.

ABRAHAMITES, an order of monks extermina-

ted for idolatry by Theophilus in the ninth century. Also the name of another sect of heretics who had adopted the errors of Paulus. See PAULICIANS.

ABRANTES, a town of Portugal, in Estremadura, seated on the river Tajo, belongs to a marquis of the same name. It stands high, is surrounded with gardens and olive-trees, and contains thirty-five thousand inhabitants. It has four convents, an alms-house, and an hospital. W. Long. 7. 18. Lat. 39. 13.

ABRASAX, or ABRAXAS, the supreme god of the Basilidian heretics. It is a mythical word, composed of the Greek numerals α, β, γ, δ, ε, ζ, η, θ, which together make up the number CCCLXV. For Basilides taught, that there were 365 heavens between the earth and the empyrean; each of which heavens had its angel or intelligence, which created it; each of which angels likewise was created by the angel next above it; thus ascending by a scale to the supreme Being, or first Creator. The Basilidians used the word *Abraxas* by way of charm or amulet.

ABRASION, in medicine, the corroding of any part by acrid humours or medicines.

ABRAX, an antique stone with the word *abraxas* engraven on it. They are of various sizes, and most of them as old as the third century.

ABREAST, (a sea-term) side by side, or opposite to; a situation in which two or more ships lie, with their sides parallel to each other, and their heads equally advanced. This term more particularly regards the line of battle at sea, where, on the different occasions of attack, retreat, or pursuit, the several squadrons or divisions of a fleet are obliged to vary their dispositions, and yet maintain a proper regularity by sailing in right or curved lines. When the line is formed *abreast*, the whole squadron advances uniformly, the ships being equally distant from and parallel to each other, so that the length of each ship forms a right angle with the extent of the squadron or line abreast. The commander in chief is always stationed in the center, and the second and third in command in the centers of their respective squadrons. --- *Abreast*, within the ship, implies on a line with the beam, or by the side of any object aboard; as, the frigate sprung a leak *abreast* of the main hatch-way, i. e. on the same line with the main hatch-way, crossing the ship's length at right angles, in opposition to *afore* or *abaft* the hatch-way * --- We discovered a fleet *abreast* of Beachy-head; i. e. off, or directly opposite to it.

ABRETTENE, (Strabo) ABRETTINE, (Stephanus); a district of Mysia, in Asia. Hence the epithet *Abrettinus* given Jupiter, (Strabo); whose priest was Cleon, formerly at the head of a gang of robbers, and who received many and great favours at the hand of Antony, but afterwards went over to Agullus. The people were called *Abrettini*; inhabiting the country between Ancyra of Phrygia, and the river Rhodacus.

ABRIDGEMENT, in literature, a term signifying the reduction of a book into a smaller compass.

The art of conveying much sentiment in few words, is the happiest talent an author can be possessed of. This talent is peculiarly necessary in the present state of literature; for many writers have acquired the dexterity of spreading a few trivial thoughts over several hundred pages. When an author hits upon a thought that pleases him, he is apt to dwell upon it, to view it in different lights, to force it in improperly, or upon the

Abantes
|
Abridge-
ment.

* Tradit.
Hebraic. in
Genetio.

§ It is
the proper
name of a
city, and it
also signifi-
es fire. The
Lat. version,
Eridras ix.
has this thus;
*Qui elegit
eum de igne
Chaldeorum.*

* Antiq.
lib. i. cap. 7,
8.

† Heidegger.
Hist. Patri-
arch. tom. ii.
p. 143.

‡ Advers.
lib. p. 286.

§ Kirchem's
treasures of li-
braries,
p. 144.

* See *Abess.*

the slightest relations. Though this may be pleasant to the writers, it tires and vexes the reader. There is another great source of diffusion in composition. It is a capital object with an author, whatever be the subject, to give vent to all his best thoughts. When he finds a proper place for any of them, he is peculiarly happy. But, rather than sacrifice a thought he is fond of, he forces it in by way of digression, or superfluous illustration. If none of these expedients answer his purpose, he has recourse to the margin, a very convenient apartment for all manner of pedantry and impertinence. There is not an author, however correct, but is more or less faulty in this respect. An abridger, however, is not subject to these temptations. The thoughts are not his own; he views them in a cooler and less affectionate manner; he discovers an impropriety in some, a vanity in others, and a want of utility in many. His business, therefore, is to retrench superfluities, digressions, quotations, pedantry, &c. and to lay before the public only what is really useful. This is by no means an easy employment: To abridge some books, requires talents equal, if not superior, to those of the author. The facts, manner, spirit, and reasoning, must be preserved; nothing essential, either in argument or illustration, ought to be omitted. The difficulty of the task is the principal reason why we have so few good abridgements: Wynne's abridgement of Locke's Essay on the Human Understanding, is, perhaps, the only unexceptionable one in our language.

These observations relate solely to such abridgements as are designed for the public. But,

When a person wants to set down the substance of any book, a shorter and less laborious method may be followed. It would be foreign to our plan to give examples of abridgements for the public: But as it may be useful, especially to young people, to know how to abridge books for their own use, after giving a few directions, we shall exhibit an example or two, to shew with what ease it may be done.

Read the book carefully; endeavour to learn the principal view of the author; attend to the arguments employed: When you have done so, you will generally find, that what the author uses as new or additional arguments, are in reality only collateral ones, or extensions of the principal argument. Take a piece of paper or a common-place book, put down what the author wants to prove, subjoin the argument or arguments, and you have the substance of the book in a few lines. For example,

In the Essay on Miracles, Mr Hume's design is to prove, That miracles which have not been the immediate objects of our senses, cannot reasonably be believed upon the testimony of others.

Now, his argument (for there happens to be but one) is,

"That experience, which in some things is variable, is in others uniform, is our only guide in reasoning concerning matters of fact. A variable experience gives rise to probability only; an uniform experience amounts to a proof. Our belief of any fact from the testimony of eye-witnesses, is derived from no other principle than our experience in the veracity of human testimony. If the fact attested be miraculous, here arises a contest of two opposite experiences, or proof against proof. Now, a miracle is

"a violation of the laws of nature; and as a firm and unalterable experience has established these laws, the proof against a miracle, from the very nature of the fact, is as complete as any argument from experience can possibly be imagined; and if so, it is an undeniable consequence, that it cannot be surmounted by any proof whatever derived from human testimony."

In Dr Campbell's Dissertation on Miracles, the author's principal aim is to shew the fallacy of Mr Hume's argument; which he has done most successfully by another single argument, as follows:

"The evidence arising from human testimony is not solely derived from experience: on the contrary, testimony hath a natural influence on belief antecedent to experience. The early and unlimited assent given to testimony by children gradually contracts as they advance in life: it is, therefore, more consonant to truth, to say, that our diffidence in testimony is the result of experience, than that our faith in it has this foundation. Besides, the uniformity of experience, in favour of any fact, is not a proof against its being reversed in a particular instance. The evidence arising from the single testimony of a man of known veracity will go farther to establish a belief in its being actually reversed: If his testimony be confirmed by a few others of the same character, we cannot withhold our assent to the truth of it. Now, though the operations of nature are governed by uniform laws, and though we have not the testimony of our senses in favour of any violation of them; still, if in particular instances we have the testimony of thousands of our fellow-creatures, and those too men of strict integrity, swayed by no motives of ambition or interest, and governed by the principles of common sense, That they were actually eye-witnesses of these violations, the constitution of our nature obliges us to believe them."

These two examples contain the substance of about 400 pages.—Making private abridgements of this kind has many advantages; it engages us to read with accuracy and attention; it fixes the subject in our minds; and, if we should happen to forget, instead of reading the books again, by glancing a few lines we are not only in possession of the chief arguments, but recall in a good measure the author's method and manner.

Abridging is peculiarly useful in taking the substance of what is delivered by Professors, &c. It is impossible, even with the assistance of short-hand, to take down, *verbatim*, what is said by a public speaker. Besides, although it were practicable, such a talent would be of little use. Every public speaker has circumlocutions, redundancies, lumber, which deserve not to be copied. All that is really useful may be comprehended in a short compass. If the plan of the discourse, and arguments employed in support of the different branches, be taken down, you have the whole. These you may afterwards extend in the form of a discourse dressed in your own language. This would not only be a more rational employment, but would likewise be an excellent method of improving young men in composition, an object too little attended to in all our universities.

ABRIDGEMENT, in law, signifies the making a declaration or plaint shorter by leaving out something.

Abrodi-
etical
||
Absolute

ABRODIETICAL; delicate or nice in diet.

ABROGATION, signifies annulling, making void, or repealing a law.

ABROLKOS, the name of certain shelves, or banks of sand, about 20 leagues from the coast of Brazil.

ABROTANUM, in botany, a fynonime of several plants. See ARTEMISIA, FILAGO, SANTOLINA; and MATERIA MEDICA, n° 62, 63.

ABROTUNUM, a town and harbour on the Mediterranean, in the district of Syrtis Parva, in Africa, (Strabo, Pliny :) one of the three cities that went to form Tripoly.

ABRUS, in botany, the trivial name of the glycine*.

* See Gly-
cine.

ABRUZZO, a province in Naples. The river Pescara divides it into two parts; one of which is called Ulterior, whereof Aquila is the capital; and the other Citerior, whose capital is Solomona. Besides the Apennines, there are two considerable mountains, the one called Monte Cavallo, and the other Monte Maiello. The top of this last is always covered with snow. Abruzzo is a cold but fruitful country; and abounds with corn, rice, several good fruits, and saffron.

ABSALEM, the son of David by Maacah, was brother to Thamar David's daughter, who was ravished by Amnon his eldest brother by another mother. He waited two years for an opportunity of revenging the injury done to his sister, and at last procured the assassination of Amnon at a feast which he had prepared for the king's sons. He took refuge with Talmai king of Geshur; and was no sooner restored to favour, but he engaged the Israelites to revolt from his father. Absalom was defeated in the wood of Ephraim: as he was flying, his hair caught hold of an oak, where he hung till Joab came and thrust him through with three darts: David had expressly ordered his life to be spared, and extremely lamented him.

ABSCEDENTIA, in surgery, a term applied to decayed parts of the body, which, in a morbid state, are separated from the sound, or lose that union which was preferred in a natural state.

ABSCISS, in surgery, from *abscido*, to depart. A cavity containing pus; or, a gathering of matter in a part: So called, because the parts which were joined are now separated; one part recedes from another, to make way for the collected matter. See SURGERY, n° 8.

ABSCISSION, a figure in rhetoric, whereby the speaker stops short in the middle of his discourse, leaving the audience to make the inference.

ABSCISSION, in surgery, the fame with amputation.

ABSCONSA, a dark lantern used by the monks at the ceremony of burying their dead.

ABSENCE, in Scots law: When a person cited before a court does not appear, and judgment is pronounced, that judgment is said to be *in absence*. No person can be tried criminally in absence*.

* See Law,
Part III.,
No cxxxv.
2, 4.

ABSENTHIATED Medicines, such as are impregnated with absinthium or wormwood.

ABSENTHIUM, in botany, the trivial name of the common wormwood or artemisia. It is also a fynonime of the tanacetum incanum, the fenecio incanum, the anthemion montana, the achillaea apyrtica, and of the parthenium hysterophorus. See ARTEMISIA, &c. and MATERIA MEDICA, n° 64, 65, 66.

ABSIS, in astronomy, the fame with APSIS.

ABSOLUTE, in a general sense, denotes a thing's

being independent of, or unconnected with, any other; it is also used to express freedom from all limitation.

ABSOLUTE Gravity, in physics, is the whole force by which a body is urged downwards.

ABSOLUTE Government, is that wherein the prince, unlimited by the laws, is left solely to his own will*.

Absolute
||
Absolus.

* See Go-
vernment.

ABSOLUTE Equation, in astronomy, is the aggregate of the optic and eccentric equations. The apparent inequality of a planet's motion arising from its not being equally distant from the earth at all times, is called its optic equation, and would subsist even if the planet's real motion were uniform. The eccentric inequality is caused by the planet's motion being uniform. To illustrate which, conceive the sun to move, or to appear to move, in the circumference of a circle, in whose centre the earth is placed. It is manifest, that if the sun moves uniformly in this circle, it must appear to move uniformly to a spectator on the earth, and in this case there will be no optic nor eccentric equation: but suppose the earth to be placed out of the centre of the circle, and then, though the sun's motion should be really uniform, it would not appear to be so, being seen from the earth: and in this case there would be an optic equation, without an eccentric one. Imagine farther, the sun's orbit to be not circular, but elliptic, and the earth in its focus; it will be as evident that the sun cannot appear to have an uniform motion in such ellipse: so that his motion will then be subject to two equations, the optic and the eccentric. See EQUATION.

ABSOLUTE Motion } (MOTION.
ABSOLUTE Space } See SPACE.
ABSOLUTE Time } (TIME.

ABSOLUTE, in metaphysics, denotes a being that possesses independent existence.

ABSOLUTION, in general, is the pardoning or forgiving a guilty person.

ABSOLUTION, in civil law, is a sentence whereby the party accused is declared innocent of the crime laid to his charge.

ABSOLUTION, in the canon law, is a juridical act, whereby the priest declares the sins of such as are penitent remitted.

ABSOLUTION is chiefly used among Protestants for a sentence whereby a person who stands excommunicated is released or freed from that punishment.

ABSORBENT Medicines, testaceous powders, as chalk, crab-eyes, &c. which are taken inwardly for drying up or absorbing any acid or redundant humours in the stomach or intestines. They are likewise applied outwardly to ulcers or sores with the same intention*.

ABSORBENT Vessels, a name given promiscuously to the lacteal vessels, lymphatics, and inhalant arteries†. Naturalists speak of the like absorbents in plants, the fibrous or hairy roots of which are as a kind of vasa absorbentia, which attract and imbibe the nutritious juices from the earth. See PLANTS, n° 21, 50.

ABSORBING, the swallowing up, sucking up, or imbibing, any thing: thus black bodies are said to absorb the rays of light; luxuriant branches, to absorb or waste the nutritious juices which should feed the fruit of trees, &c.

ABSORPTION, the effects of absorbing. In the animal economy, it is the act whereby the absorbent vessels imbibe the juices‡, &c.

ABSORUS, APSORUS, ABSYRTIS, ABSYRTIDES, ABSYRTIDES 370.

† See Anato-
my, n° 369,
APSYRTIDES

Abstemious **APSYRTIDES**, **APSYRTIS**, and **ABSYRTIUM**, (Strabo, Mela, Ptolemy;) islands in the Adriatic, in the gulf of Carnero; so called from **Abysrtus**, Medea's brother, there slain. They are either one island, or two, separated by a narrow channel, and joined by a bridge; and are now called *Cherso* and *Osero*.

ABSTEMIOUS, **ABSTEMI**, in church-history, a name given to such persons as could not partake of the cup of the eucharist, on account of their natural aversion to wine. Calvinists allow these to communicate in the species of bread only, touching the cup with their lip; which, on the other hand, is by the Lutherans deemed a profanation.

ABSTEMIUS (Laurentius) a native of Maccrata, professor of belles lettres in Urbino, and librarian of duke Guido Ubaldo, under the pontificate of Alexander VI. He wrote, 1. Notes on most difficult passages of ancient authors. 2. *Hecatomythium*, i. e. A collection of an 100 fables, &c. which have been often printed with those of *Æsop*, *Phædrus*, *Gabrius*, *Avianus*, &c.

ABSTERGENT Medicines, those employed for resolving obstructions, concretions, &c. such as soap, &c.

ABSTINENCE, in a general sense, the act or habit of refraining from something which we have a propensity to or find pleasure in.—Among the Jews, various kinds of abstinence were ordained by their law. Among the primitive Christians, some denied themselves the use of such meats as were prohibited by that law, others looked upon this abstinence with contempt; as to which, St Paul gives his opinion, Rom. xiv. 1—3. The council of Jerusalem, which was held by the Apostles, enjoined the Christian converts to abstain from meats strangled, from blood, from fornication, and from idolatry. Abstinence, as prescribed by the gospel, is intended to mortify and restrain the passions, to humble our vicious natures, and by that means raise our minds to a due sense of devotion. But there is another sort of abstinence, which may be called *ritual*, and consists in abstaining from particular meats at certain times and seasons. It was the spiritual monarchy of the western world, which first introduced this ritual abstinence; the rules of which were called *rogations*; but grossly abused from the true nature and design of fasting.—In England, abstinence from flesh has been enjoined by statute even since the reformation, particularly on Fridays, and Saturdays, on vigils, and on all commonly called *fast-days*. The like injunctions were renewed under Q. Elizabeth: but at the same time it was declared, that this was done not out of motives of religion, as if there were any difference in meats; but in favour of the consumption of fish, and to multiply the number of fishermen and mariners, as well as spare the flock of sheep. The great fast, says St Augustine, is to abstain from sin.

ABSTINENCE is more particularly used for a spare diet, or a slender parsimonious use of food, below the ordinary standard of nature. The physicians relate wonders of the effects of abstinence in the cure of many disorders, and protracting the term of life. The noble Venetian, Comaro, after all imaginable means had proved vain, so that his life was despaired of at forty, recovered, and lived to near an hundred, by mere dint of abstinence; as he himself gives the account. It is indeed surprising to what a great age the primitive

Christians of the East, who retired from the persecutions into the deserts of Arabia and Egypt, lived, healthful and cheerful, on a very little food. Cassian assures us, that the common rate for 24 hours was 12 ounces of bread, and mere water: with this St Anthony lived 105 years; James the hermit, 104; Arsenius, tutor of the Emperor Arcadius, 120; S. Epiphanius, 115; Simeon the Stylite, 112; and Romauld, 120. Indeed, we can match these instances of longevity at home. Buchanan writes, that one Laurence preserved himself to 140 by force of temperance and labour; and Spotwood mentions one Kentigern, afterwards called S. Mongah or Mungo, who lived to 185 by the same means. Other instances see under the article **LONGEVITY**.—Abstinence, however, is to be recommended only as it means a proper regimen; for in general it must have bad consequences when observed without a due regard to constitution, age, strength, &c. According to Dr Cheyne, most of the chronic diseases, the infirmities of old age, and the short lives of Englishmen, are owing to repletion; and may be either cured, prevented, or remedied by abstinence: but then the kinds of abstinence which ought to obtain, either in sickness or health, are to be deduced from the laws of diet and regimen*.

Among the brute creation, we see extraordinary instances of long abstinence. The serpent-kind, in particular, bear abstinence to a wonderful degree. We have seen rattle-snakes that had subsisted many months without any food, yet still retained their vigour and fierceness. Dr Shaw speaks of a couple of cerastes, (a sort of Egyptian serpents), which had been kept five years in a bottle close corked, without any sort of food, unless a small quantity of sand wherein they coiled themselves up in the bottom of the vessel may be reckoned as such: yet when he saw them, they had newly cast their skins, and were as brisk and lively as if just taken. But it is even natural for divers species to pass four, five, or six months every year, without either eating or drinking. Accordingly, the tortoise, bear, dormouse, serpent, &c. are observed regularly to retire, at those seasons, to their respective cells, and hide themselves, some in the caverns of rocks or ruins; others dig holes under ground; others get into woods, and lay themselves up in the clefts of trees; others bury themselves under water, &c. And these animals are found as fat and fleshy after some months abstinence as before.—Sir G. Ent* weighed his tortoise several years successively, at its going to earth in October, and coming out again in March; and found, that, of four pounds four ounces; it only used to lose about one ounce.—Indeed, we have instances of men passing several months as strictly abstinent as other creatures. In particular, the records of the Tower mention a Scotchman imprisoned for felony, and strictly watched in that fortress for six weeks: in all which time he took not the least sustenance; for which he had his pardon. Numberless instances of extraordinary abstinence, particularly from morbid causes, are to be found in the different periodical Memoirs, Transactions, Ephemerides, &c.—It is to be added, that, in most instances of extraordinary human abstinence related by naturalists, there were said to have been apparent marks of a texture of blood and humours, much like that of the animals above mentioned. Though it is no improbable opinion, that the air itself

Abstinence.

* See *diet, meat, Diet, Regimen; & Medicine, Part VI. n° 318, &c.*

* Phil. Trans. n° 194.

may

Abstruse
||
Abstraction

may furnish something for nutrition. It is certain, there are substances of all kinds, animal, vegetable, &c. floating in the atmosphere, which must be continually taken in by respiration. And that an animal body may be nourished thereby, is evident in the instance of vipers; which if taken when first brought forth, and kept from every thing but air, will yet grow very considerably in a few days. So the eggs of lizards are observed to increase in bulk, after they are produced, though there be nothing to furnish the increment but air alone; in like manner as the eggs or spawn of fishes grow and are nourished with the water. And hence, say some, it is that cooks, turnspit-dogs, &c. though they eat but little, yet are usually fat.

ABSTINENTS, or ABSTINENTES, a set of heretics that appeared in France and Spain about the end of the third century. They are supposed to have borrowed part of their opinions from the Gnostics and Manicheans, because they opposed marriage, condemned the use of meats, and placed the Holy Ghost in the class of created beings.

ABSTRACT *Idea*, in metaphysics, is a partial idea of a complex object, limited to one or more of the component parts or properties, laying aside or abstracting from the rest. Thus, in viewing an object with the eye, or recollecting it in the mind, we can easily abstract from some of its parts or properties, and attach ourselves to others: we can attend to the redness of a cherry, without regard to its figure, taste, or confidence. See ABSTRACTION.

ABSTRACT *Terms*, words that are used to express abstract ideas. Thus beauty, ugliness, whiteness, roundness, life, death, are abstract terms.

ABSTRACT *Numbers*, are assemblages of units, considered in themselves, without denoting any particular and determined particulars. Thus 6 is an abstract number, when not applied to any thing; but, if we say 6 feet, 6 becomes a concrete number. See the article NUMBER.

ABSTRACT *Mathematics*, otherwise called Pure Mathematics, is that which treats of magnitude or quantity, absolutely and generally considered, without restriction to any species of particular magnitude; such are Arithmetic and Geometry. In this sense, abstract mathematics is opposed to mixed mathematics, wherein simple and abstract properties, and the relations of quantities primitively considered in pure mathematics, are applied to sensible objects, and by that means become intermixed with physical considerations; such are Hydrostatics, Optics, Navigation, &c.

ABSTRACTION, the operation of the mind when occupied by abstract ideas. A large oak fixes our attention, and abstracts us from the shrubs that surround it. In the same manner, a beautiful woman in a crowd, abstracts our thoughts, and engrosses our attention solely to herself. These are examples of real abstraction: when these, or any others of a similar kind, are recalled to the mind after the objects themselves are removed from our sight, they form what is called *abstract ideas*, or the mind is said to be employed in abstract ideas. But the power of abstraction is not confined to objects that are separable in reality as well as mentally: the size, the figure, the colour of a tree are inseparably connected, and cannot exist independent of each other; and yet we can mentally confine our

observations to any one of these properties, neglecting or abstracting from the rest.

ABSTRUSE, something deep, hidden, concealed, or far removed from common apprehensions, and therefore not easily understood; in opposition to what is obvious and palpable. Thus metaphysics is an abstruse science; and the doctrine of fluxions, and the method de maximis et minimis, are abstruse points of knowledge.

ABSRD, an epithet applied to any thing that opposes the human apprehension, and contradicts a manifest truth. Thus, it would be absurd to say that six and six make only 10, or to deny that twice six make 12. When the term *absurd* is applied to actions, it has the same import as *ridiculous*.

ABSRDITY, an impropriety, or something that opposes an evident truth or principle. The contradiction is the greatest of all absurdities.

ABSYNTHUM. See ABSINTHIUM.

ABSYRTUS, in the heathen mythology, the son of Æta and Hypsæa, and the brother of Medæa. The latter running away with Jason, after her having afflicted him in carrying off the golden fleece, was pursued by her father; when, to stop his progress, she tore Absyrtus in pieces, and scattered his limbs in his way.

ABTHANES, a title of honour used by the ancient inhabitants of Scotland, who called their nobles *thanes*, which in the old Saxon signifies *king's ministers*; and of these the higher rank were styled *abthanes*, and those of the lower *underthanes*.

ABUCARAS (Theodorus), metropolitan of Caria in the ninth century, was remarkable for his zeal in defending what he believed to be the truth, and was the author of above forty controversial treatises against the Saracens, Jews, and reputed heretics. This metropolitan at first embraced the doctrines of Photius; for which, begging pardon of the council of Constantinople in 869, he was restored to the communion of the church, and obtained a seat in the council. His works are inserted in the Supplement of the *Bibliothèque des Peres*, the Paris edition.

ABUKESO, in commerce, the same with ASLAN *. *Which see.

ABULFARAGIUS (Gregory), son to Aaron a physician, born in 1226, in the city of Malatia, near the source of the Euphrates in Armenia. He followed the profession of his father; and practised with great success, numbers of people coming from the most remote parts to ask his advice. However, he would hardly have been known at this time, had his knowledge been confined to physic: but he applied himself to the study of the Greek, Syriac, and Arabic languages, as well as philosophy and divinity; and he wrote a history which does honour to his memory. It is written in Arabic, and divided into dynasties. It consists of ten parts, being an epitome of universal history from the creation of the world to his own time. Dr Pocock published it with a Latin translation in 1663; and added, by way of supplement, a short continuation relating to the history of the eastern princes.

ABUNA, the title given to the archbishop or metropolitan of Abyssinia. See ABYSSINIAN.

ABUNDANT *Number*, in arithmetic, is a number, the sum of whose aliquot parts is greater than the number itself. Thus the aliquot parts of 12, being 1, 2, 3, 4, and 6, they make, when added together, 16.

Abstruse
||
Abundant.

Abundantia

Abyfs.

An abundant number is opposed to a *deficient* number, or that which is greater than all its aliquot parts taken together; as 14, whose aliquot parts are 1, 2, and 7, which make no more than 10: and to a *perfect* number, or one to which its aliquot parts are equal, as 6, whose aliquot parts are 1, 2, and 3.

ABUNDANTIA, a heathen divinity, represented in ancient monuments under the figure of a woman with a pleasing aspect, crowned with garlands of flowers, pouring all sorts of fruit out of a horn which she holds in her right hand, and scattering grain with her left, taken promiscuously from a heap of corn. On a medal of Trajan, she is represented with two cornucopiz.

ABUS, (Tacitus); a river of Britain, formed by the confluence of the Ure, the Derwent, Trent, &c. falling into the German sea, between Yorkshire and Lincolnshire, and forming the mouth of the Humber.

ABUSE, in a general sense, implies the perverting something from its genuine or original intention. Thus an abuse of words is the using them without any clear and distinct ideas.

ABUTILON, in botany, the trival name of several species of the fida. See SIDA. Abutilon is also a synonyme of the melochia tomentosa and melochia depressa, two American plants of the monadelphia pentandria class. It is likewise a synonyme of the lavatera, malva, and hibiscus.

ABYDOS, anciently a town built by the Milesians in Asia, on the Hellespont, where it is scarce a mile over, opposite to Sestos on the European side, (Dionysius Periegetes.) Now both called the *Dardanellers*. Abydos lay midway between Lampæus and Ilium, famous for Xerxes's bridge, (Herodotus, Virgil); and for the loves of Leander and Hero, (Mæneus, Ovid); celebrated also for its oysters, (Ennius, Virgil.) The inhabitants were a soft, effeminate people, given much to dissipation; hence the proverb, *Ne temere Abydum*, when we would caution against danger, (Stephanus.)

ABYDOS, (Strabo, Pliny); anciently an inland town of Egypt, between Ptolemais and Diospolis Parva, towards Syene; famous for the palace of Memnon, and the temple of Osiris. A colony of Milesians; (Stephanus.)

ABYLA, (Ptolemy, Mela); one of Hercules's pillars, on the African side, called by the Spaniards *Sierra de las Monas*, over against Calpe in Spain, the other pillar; supposed to have been formerly joined, but separated by Hercules, and thus to have given entrance to the sea now called the *Mediterranean*: the limits of the labours of Hercules, (Pliny.)

ABYSS, in a general sense, denotes something profound, and, as it were, bottomless. The word is originally Greek, *αβυσσος*; compounded of the privative *α*, and *βυσσο*, bottom; *q. d.* without a bottom.

ABYSS, in a more particular sense, denotes a deep mass or fund of waters. In this sense, the word is particularly used, in the Septuagint, for the water which God created at the beginning with the earth, which encompassed it round, and which our translators render by *deep*. Thus it is that darkness is said to have been on the face of the abyss.

ABYSS is also used for an immense cavern in the earth, where God collected all those waters on the third day; which, in our version, is rendered the *sear*, and elsewhere the *great deep*. Dr Woodward, in his

Natural History of the Earth, asserts, That there is a mighty collection of waters inclosed in the bowels of the earth; constituting a huge orb in the interior or central parts of it; and over the surface of this water he supposes the terrestrial strata to be expanded. This, according to him, is what Moses calls the *great deep*, and what most authors render the *great Abyss*. The water of this vast Abyss, he asserts, does communicate with that of the ocean, by means of certain hiatus's or chasms passing betwixt it and the bottom of the ocean: and this and the Abyss he supposes to have one common centre, around which the water of both is placed; but so, that the ordinary surface of the Abyss is not level with that of the ocean, nor at so great a distance from the centre as the other, it being for the most part restrained and depressed by the strata of earth lying upon it: but where-ever those strata are broken, or so lax and porous that water can pervade them, there the water of the Abyss ascends; fills up all the clefts and fissures into which it can get admittance; and saturates all the interstices and pores of the earth, stone, or other matter, all around the globe, quite up to the level of the ocean.—The existence of an abyss, or receptacle of subterraneous waters, is controverted by Camerarius*; and defended by Dr Woodward, chiefly by two arguments: the first drawn from the vast quantity of water which covered the earth in the time of the deluge; the second, from the consideration of earthquakes, which he endeavours to shew are occasioned by the violence of the waters in this abyss. A great part of the terrestrial globe has been frequently shaken at the same moment; which argues, according to him, that the waters, which were the occasion thereof, were coextended with that part of the globe. There are even instances of universal earthquakes; which (says he) shew, that the whole abyss must have been agitated: for so general an effect must have been produced by as general a cause, and that cause can be nothing but the subterraneous Abyss†.—To this abyss also has been attributed the origin of springs and rivers; the level maintained in the surfaces of different seas; and their not overflowing their banks. To the effluvia emitted from it, some even attribute all the diversities of weather and changes in our atmosphere‡. Ray§, and other authors, ancient as well as modern, suppose a communication between the Caspian sea and the ocean by means of a subterranean abyss: and to this they attribute it, that the Caspian does not overflow, notwithstanding the great number of large rivers it receives, of which Kemper reckons above 50 in the compass of 60 miles; tho', as to this, others suppose that the daily evaporation may suffice to keep the level.—After all, however, that has been advanced by naturalists concerning this Abyss, its existence remains as yet unestablished by any solid proofs.

ABYSS is also used to denote hell. In which sense the word is synonymous with what is otherwise called *Barathrum*, *Erebus*, and *Tartarus*; in the English bible, the *bottomless pit*. The unclean spirits expelled by Christ, begged, *ne imperaret ut in abyssum irent*, according to the vulgate; *ut abussos*, according to the Greek. Luke viii. 31. Rev. ix. 1.

ABYSS is more particularly used, in antiquity, to denote the temple of Proserpine. It was thus called on account

Abyfs.

* Differt. Traut. Auct. Erud. supp. tom. vi. p. 24.

† Hist. of the earth. Journ. de Savans, tom. livii. p. 393. Memoirs of Literature, tom. viii. p. 101, &c. § Holloway, introd. to Woodward's list. of the Earth. Acta Erud. 1727. p. 313. ¶ Physico-Theol. Dile. ii. c. 2. p. 76.

account of the immense fund of gold and riches deposited there; some say, hid under ground.

ABYSS is also used, in heraldry, to denote the centre of an escutcheon. In which sense, a thing is said to be bore in abyss, *en abyssme*, when placed in the middle of the shield, clear from any other bearing: He bears azure, a flower de lis, in abyss.

ABYSSINIA, by some called *Higher Ethiopia*, and by the Arabians *Al Habash*, is bounded on the north by Nubia; on the east, by the Arabic gulph or Red Sea, and the kingdom of Adél; on the south, by the kingdoms of Aján, Alaba, and Gíngiro; and on the west, by the kingdom of Goram and part of Gíngiro; and is divided into a great number of provinces. The principal river is the Nile, which has its source in this country; and the most considerable lake, that of Dambea, which discharges itself into the Nile, is about 700 miles in length, and 90 in breadth. The air is pretty temperate in the mountains, and therefore their towns and strong-holds are generally placed on them; but in the valleys it is hot and suffocating. The soil and face of the country is various. In some places there are nothing but rocks and profound caverns; in others, especially where there are rivers, the land is exceeding fruitful; and the banks of these streams are bordered with flowers of various kinds, many of which are unknown in Europe. The torrents in the rainy season wash a great deal of gold from the mountains. This season begins in May, when the sun is vertical, or directly over their heads; and ends in September. To these torrents is attributed the overflowing of the Nile, the cause of which so much puzzled the ancients. It was commonly attributed to the melting of the snow upon the hills in these parts: but experience has since undeceived the world; for there is no snow, even on the highest hills in this country.—The country produces a great variety of animals, both tame and wild, such as lions, tigers, rhinoceroses, leopards, elephants, monkeys, stags, deer; horses, camels, dromedaries, goats, cows, sheep; likewise ostriches, with a vast variety of other birds. In the rivers are crocodiles and the hippopotamus. Travelers mention also a peculiar kind of bees, small, black, and without a sting, which hive in the earth, and make honey and wax that are extremely white. The country is greatly infested with locusts, which devour every thing that is green wherever they come.—Besides the large towns, there are a great number of villages, which in some places are so thick sown, that they look like one continued town: the houses are very mean, being but one story high; and built of straw, earth, and lime. In most of the towns the houses are separated by hedges, which are always green, and mixed with flowers and fruit-trees at a certain distance from each other, which affords an agreeable prospect.—The government is monarchical. The sovereign has the title of Negus, and is an absolute prince. When he is in camp, the tents are so regularly disposed as to have the appearance of a city; and there is a captain over every division, to prevent disorders and to execute justice.—The Abyssinians in general are of an olive complexion, tall, graceful, and well featured. Those who are neither mechanics or tradesmen (which few of them are), nor tillers of the ground, are inured to bear arms, which are a head-piece, a buckler, a coat of mail, bows and arrows, darts, pikes capped with iron at both ends, a

sling, and a sword: they have very few fire-arms, and those were introduced by the Portuguese. The habit of persons of quality is a silken velt, or fine cotton, with a kind of scarf. The citizens have the same habit, only coarser. The common people have nothing but a pair of cotton drawers, and a scarf which covers the rest of their body. The women are of a healthy constitution, active, and moderately handsome, having neither flat noses nor thick lips like the negroes; and nature is so friendly, that they stand in little need of midwives, which is indeed the case of most countries in the torrid zone. They appear in public as in Europe, without being forbid the conversation of the men as among the Mahometans. Princesses of the royal blood are not permitted to marry foreigners; and when they take the air, they go in great state, with 400 or 500 women attendants. Their language is the Ethiopic, which bears a great affinity with the Arabic; but particular provinces have a different dialect. As to their religion; see the next article.

Manufactures are almost wholly wanting in this country; and the few trades which they have amongst them are always conveyed from the father to the children. They seem indeed by their churches, and other ruined places, to have had a knowledge of architecture. But the workmen were sent for from other countries, and were forced to do all themselves; so that when these fabrics were reared, especially the imperial palace built by Peter Pais, a Portuguese architect, the people flocked from all parts of Ethiopia to view it, and admired it as a new wonder of the world.—Gold, silver, copper, and iron, are the principal ores with which their mines abound in this extensive part of Africa; but not above one third part is made use of by way of merchandize, or converted into money; of which they have little or no use in Abyssinia. They cut their gold indeed into small pieces for the pay of their troops, and for expenses of the court, which is but a modern custom among them; the king's gold, before the end of the 17th century, being laid up in his treasury in ingots, with intent to be never carried out, nor ever used in any thing but vessels and trinkets for the service of the palace. In the lieu of small money, they make use of rock-salt as white as snow and as hard as stone. This is taken out of the mountain of Lafta, and put into the king's warehouses; where it is reduced into tablets of a foot long, and three inches broad, ten of which are worth about a French crown. When they are circulated in trade, they are reduced into still smaller pieces, as occasion requires. This salt is also applied to the same purpose as common sea-salt. With this mineral salt they purchase pepper, spices, and silk stuffs, which are brought to them by the Indians, in their ports in the Red Sea. Cardamums, ginger, aloes, myrrh, cassia, civet, ebony-wood, ivory, wax, honey, cotton and linens of various sorts and colours, are merchandizes which may be had from Abyssinia; to which may be added sugar, hemp, flax, and excellent wines, if these people had the art of preparing them. It is affirmed there are in this country the finest emeralds that are any where to be found; and, though they are found but in one place, they are there in great quantities, and some so large and so perfect as to be of almost incalculable value. The greatest part of the merchandizes above mentioned, are more for foreign than inland

Abyssinia,
Abyssinian.

land trade. Their domestic commerce consists chiefly in salt, honey, buck-wheat, grey pease, citrons, oranges, lemons, and other provisions, with fruits and herbage necessary for the support of life. Those places that the Abyssinian merchants frequent the most, who dare venture to carry their commodities by sea themselves, are Arabia Felix, and the Indies, particularly Goa, Cambaye, Bengal, and Sumatra. With regard to their ports on the Red Sea, to which foreign merchants commonly resort, the most considerable are those of Mette, Azum, Zajalla, Maga, Dazo, Patea, and Brava. The trade of the Abyssinians by land is inconsiderable. There are, however, bands of them who arrive yearly at Egypt, particularly at Cairo, laden with gold dust, which they bring to-barter for the merchandizes of that country, or of Europe, for which they have occasion. These caravans or caravans, if we may be allowed thus to call a body of 40 or 50 poor wretches who unite together for their mutual assistance in their journey, are commonly three or four months on their route, traversing forests and mountains almost impassable, in order to exchange their gold for necessaries for their families, and return immediately with the greatest part of the merchandize on their backs. Frequently the Jews or Egyptians give them large credit; which may seem surprising, as they are beyond recourse if they should fail of payment. But experience has shewn, that they have never abused the confidence reposed in them; and even in the event of death, their fellow-travellers take care of the effects of the deceased for the benefit of their families, but in the first place for the discharge of those debts contracted at Cairo.—It remains only to be observed, that one of the principal branches of trade of the Abyssines is that of slaves; who are greatly esteemed in the Indies and Arabia for the best, and most faithful, of all that the other kingdoms of Africa furnish. The Indian and Arabian merchants frequently substitute them as their factors; and, on account of their good services and integrity, not only often give them their liberty, but liberally reward them.

ABYSSINIAN, in ecclesiastical history, is used as the name of a sect, or heresy, in the Christian church, established in the empire of Abyssinia. The Abyssinians are a branch of the Copts or Jacobites; with whom they agree in admitting but one nature in Jesus Christ, and rejecting the council of Chalcedon: whence they are also called Eutychians, and stand opposed to the Melchites. They are only distinguished from the Copts, and other sects of Jacobites, by some peculiar national usages.—The Abyssinian sect or church is governed by a bishop or metropolitan styled *Abuna*, sent them by the Coptic patriarch of Alexandria residing at Cairo, who is the only person that ordains priests. The next dignity is that of Komos, or Hegumenas, who is a kind of arch-prefbyter. They have canons also, and monks: the former of whom marry; the latter, at their admission, vow celibacy, but with a reservation: these, it is said, make a promise aloud, before their superior, to keep chastity; but add, in a low voice, *as you keep it*. The emperor has a kind of supremacy in ecclesiastical matters. He alone takes cognizance of all ecclesiastical causes, except some smaller ones reserved to the judges; and confers all benefices, except that of Abuna.—The Abyssinians have at different times expressed an inclination to be

reconciled to the see of Rome; but rather out of interest of state, than any other motive. The emperor David, or the queen regent on his behalf, wrote a letter on this head to pope Clement VII. full of submission, and demanding a patriarch from Rome to be instructed by: which being complied with, he publicly abjured the doctrine of Eutychius and Dioscorus in 1626, and allowed the supremacy of the pope. Under the emperor Seltan Seghed all was undone again; the Romish missionaries settled there had their churches taken from them, and their new converts banished or put to death. The congregation of *propaganda* have made several attempts to revive the mission, but to little purpose.—The doctrines and ritual of this sectary form a strange compound of Judaism, Christianity, and superstition. They practise circumcision; and are said to extend the practice to the females as well as males: they observe both Saturday and Sunday fasts: they eat no meats prohibited by the law of Moses: women are obliged to the legal purifications: and brothers marry their brothers wives, &c. On the other hand, they celebrate the epiphany with peculiar festivity, in memory of Christ's baptism; when they plunge and sport in ponds and rivers, which has occasioned some to affirm that they were baptized anew every year. Among the saints-days is one consecrated to Pilate and his wife; by reason Pilate washed his hands before he pronounced sentence on Christ, and his wife desired him to have nothing to do with the blood of that just person. They have four lent: the great one commences ten days earlier than ours, and is observed with much severity, many abtaining therein even from fish, because St Paul says there is one kind of flesh of men, and another of fishes. They allow of divorce, which is easily granted among them, and by the civil judge; nor do their civil laws prohibit polygamy itself. They have at least as many miracles and legends of saints, as the Romish church: which proved no small embarrassment to the Jesuit missionaries, to whom they produced so many miracles, wrought by their saints, in proof of their religion, and those so well circumstantiated and attested, that the Jesuits were obliged to deny miracles to be any proof of a true religion; and in proof hereof to allege the same arguments against the Abyssinians, which Protestants in Europe allege against the Papists. They pray for the dead, and invoke saints and angels; have so great a veneration for the virgin, that they charged the Jesuits with not rendering her honour enough. Images in painting they venerate; but abhor all those in relieve, except the crosses. They hold that the soul of man is not created; because, say they, God finished all his work on the sixth day. They admit the apocryphal books, and the canons of the apostles, as well as the apostolical constitutions, for genuine. Their liturgy is given by Alvarez, and in English by Pagit.

ACA, ACE, or ACON, a town of Phœnicia, on the Mediterranean; afterwards called *Ptolemais*; now *Acre*. ACACALOTL, the Brazilian name of a bird called by some *corvus aquaticus*, or the water-raven: properly, the pelicanus carbo, or corvator. See PELICANUS.

ACACIA, EGYPTIAN THORN, or BINDING BEAN-TREE, in botany, a species of *Mimosa**, according to Linneus; tho' other botanists make it a distinct genus. *False ACACIA*. See ROBINIA.

Abyssinia
||
Acacia.

* See Mi-
msa.

Acacia
||
Academici.

Three-thorned ACACIA, or Honey-Locust. See GLE-
DITSIA.

ACACIA, in the Materia Medica. See there, n^o 67. ACACIA, among antiquaries, something resembling a roll or bag, seen on medals, as in the hands of several consuls and emperors. Some take it to represent a handkerchief rolled up, wherewith they made signals at the games; others, a roll of petitions or memorials; and some, a purple bag full of earth, to remind them of their mortality.

ACACIANS, in ecclesiastical history, the name of several sects of heretics; some of which maintained, that the Son was only a similar, not the same, substance with the Father; and others, that he was not only a distinct, but a dissimilar, substance. Two of these sects had their denomination from Acacius bishop of Cæsarea, who lived in the fourth century, and changed his opinions, so as, at different times, to be head of both. Another was named from Acacius patriarch of Constantinople, who lived in the close of the fifth century.

ACACIUS, surnamed LUSCUS, because he was blind of one eye, was bishop of Cæsarea in Palestine, and succeeded the famous Eusebius; he had a great share in the banishment of pope Liberius, and bringing Felix to the see of Rome. He gave name to a sect*, and died about the year 365. He wrote the life of Eusebius, and several other works.

ACACIUS (St.), bishop of Amida, in Mesopotamia, in 420, was distinguished by his piety and charity. He sold the plate belonging to his church, to purchase seven thousand Persian slaves who were ready to die with want and misery; and giving each of them some money, sent them home. Veranus, their king, was so affected with this noble instance of benevolence, that he desired to see the bishop; and this interview procured a peace between that prince and Theodosius I.

There have been several other eminent persons of the same name; particularly, A martyr under the emperor Decius: A patriarch of Antioch, who succeeded Basil in 458, and died in 459: A bishop of Miletum in the fifth century: A famous rhetorician in the reign of the emperor Julian; and, A patriarch of Constantinople in the fifth century; who was ambitious to draw the whole power and authority of Rome by degrees to Constantinople, for which he was delivered over irretrievably to the devil by pope Felix III.

ACADEMICIAN, or ACADEMIST, a member of an academy. See ACADEMY in the modern sense.

ACADEMICS, or ACADEMISTS, a denomination given to the cultivators of a species of philosophy originally derived from Socrates, and afterwards illustrated and enforced by Plato, who taught in a grove near Athens, consecrated to the memory of Academus an Athenian hero; from which circumstance this philosophy received the name of *academical*. Before the days of Plato, philosophy had, in a great measure, fallen into contempt. The contradictory systems and hypotheses which had successively been urged upon the world were become so numerous, that, from a view of this inconsistency and uncertainty of human opinions, many were led to conclude, that truth lay beyond the reach of our comprehension. Absolute and universal scepticism was the natural consequence of this conclusion. In order to remedy this abuse of philosophy and of the human faculties, Plato laid hold of the

principles of the academical philosophy; and, in his *Phædo*, reasons in the following manner. "If we are unable to discover truth, (says he), it must be owing to two circumstances: either there is no truth in the nature of things; or the mind, from a defect in its powers, is not able to apprehend it. Upon the latter supposition, all the uncertainty and fluctuation in the opinions and judgments of mankind admit of an easy solution: Let us therefore be modest, and ascribe our errors to the real weakness of our own minds, and not to the nature of things themselves. Truth is often difficult of access: in order to come at it, we must proceed with caution and diffidence, carefully examining every step; and, after all our labour, we will frequently find our greatest efforts disappointed, and be obliged to confess our ignorance and weakness."

Labour and caution in our researches, in opposition to rash and hasty decisions, were the distinguishing characteristics of the disciples of the ancient academy. A philosopher possessed of these principles, will be slow in his progress; but will seldom fall into errors, or have occasion to alter his opinion after it is once formed. Vanity and precipitance are the great sources of scepticism: hurried on by these, instead of attending to the cool and deliberate principles recommended by the academy, several of our modern philosophers have plunged themselves into an absurd and ridiculous kind of scepticism. They pretend to discredit things that are plain, simple, and easily comprehended; but give peremptory and decisive judgments upon subjects that evidently exceed the limits of our capacity. Of these, Berkeley and Hume are the most considerable. Berkeley denied the existence of every thing, excepting his own ideas. Mr Hume has gone a step further, and questioned even the existence of ideas; but at the same time has not hesitated to give determined opinions with regard to eternity, providence, and a future state, miraculous interpositions of the Deity, &c. subjects far above the reach of our faculties. In his essay on the academical or sceptical philosophy, he has confounded two very opposite species of philosophy. After the days of Plato, indeed, the principles of the first academy were grossly corrupted by Arcesilas, Carneades, &c. This might lead Mr Hume into the notion that the *academical* and *sceptical* philosophy were synonymous terms. But no principles can be of a more opposite nature than those which were inculcated by the old academy of Socrates and Plato, and the sceptical notions which were propagated by Arcesilas, Carneades, and the other disciples of the succeeding academics.

ACADEMY, in antiquity, a garden or villa, situated within a mile of Athens, where Plato and his followers held their philosophical conferences. It took its name from one Academus, or Ecademus, a citizen of Athens, who was the original owner of it, and made it a kind of gymnasium: he lived in the time of Theseus. Cimon embellished it with fountains, trees, and walks; but Sylla, during the siege of Athens, employed these very trees in making battering engines against the city. Cicero too had his villa, or place of retirement, near Puzzuoli, which he also named an academy, where he composed his *Academical questions*, and his book *De natura deorum*.

ACADEMY, among the moderns, is most commonly used

* See the preceding article.

Academics,
Academy.

Academies. used to signify a society of learned men, established for the improvement of any art or science.

The first Academy we read of, was established by Charlemagne, at the instigation of Alcuin. It was composed of the chief wits of the court, the emperor himself being a member. In their academical conferences, every person was to give an account of what ancient authors he had read; and each even assumed the name of some ancient author who pleased him most, or some celebrated person of antiquity. Alcuin, from whose letters we learn these particulars, took that of Flaccus, the surname of Horace: a young lord, named Angilbert, took that of Homer: Adelard, bishop of Corbie, was called Augustin: Riculf, bishop of Mentz, was Dametas; and the king himself, David *. This shews the mistake of some modern writers, who relate, that it was in conformity with the genius of the learned men of those times, who were great admirers of Roman names, that Alcuin took the name of Flaccus Albinus.

Most nations have now their Academies; but Italy has by far the greatest number.—The French have many flourishing academies, most of which were established by Lewis XIV.—We have but few in Britain; and those of chiefest note go by a different name *. There are, however, in London, the *Academy of Painting*, and that of Music; established by letters-patent, and governed by their respective directors.

In giving an account of the principal Academies, it seems most proper to arrange them according to their subjects.

I. *MEDICAL Academies*; as that of the *Naturæ Curiosæ* in Germany; that founded at Palermo in 1645; another at Venice in 1701, which meets weekly in a hall near the grand hospital; another at Geneva in 1715, in the house of M. Le Clerc. The colleges of physicians at London and Edinburgh are also, by some, ranked in the number of *Academies* *.

The *Academy of Naturæ Curiosæ*, called also the *Leopoldine Academy*, was founded in 1652 by Jo. Laur. Baufchius, a physician; who, in imitation of the English, published an invitation to all physicians to communicate their extraordinary cases; and, meeting with success, was elected president. Their works were at first published separately; but in 1670 a new scheme was laid for publishing a volume of observations every year. The first volume appeared in 1684, under the title of *Ephemerides*, and the work has been continued with some interruptions and variations of the title, &c. In 1687, the emperor Leopold took the society under his protection, granting the members several privileges, particularly that their presidents should be counts palatine of the holy Roman empire. This academy has no fixed residence or regular assemblies: instead of these, there is a kind of bureau, or office, first established at Breslau, and afterwards removed to Nuremberg, where letters, observations, &c. from correspondents or members are taken in. The academy consists of a president, two adjuncts or secretaries, and colleagues or members without restriction. The colleagues, at their admission, obligeth themselves to two things: first, to chuse some subject out of the animal, vegetable, or mineral kingdom, to handle, provided it had not been treated of by any colleague before; the second, to apply themselves to furnish materials for the Annual *Ephemerides*. Each member to bear a symbol of the academy; viz. a gold

ring, whereon, instead of a stone, is a book open, and, on the face thereof, an eye; on the other side the motto of the academy, *Nunquam otiosus*.

II. *CHIRURGICAL Academies*; as that instituted some years ago, by public authority, at Paris: the members of which were not only to publish their own and correspondents observations and improvements; but to give an account of all that is published on surgery, and to compose a complete history of the art, by their extracts from all the authors ancient and modern who have wrote on it. A question in surgery is annually proposed by the academy, and a gold medal of two hundred livres value given to him who furnishes the most satisfactory answer.

III. *ECCLESIASTICAL Academies*; as that at Bologna in Italy, instituted in 1687, employed in the examination of the doctrine, discipline, and history, of each age of the church.

IV. *COSMOGRAPHICAL Academies*; as that at Venice, called the *Argonauts*. This was instituted at the solicitation of F. Coronelli, for the improvement of geographical knowledge. Its design was to publish exact maps, both celestial and terrestrial, as well particular as general, together with geographical, historical, and astronomical descriptions. Each member, in order to defray the expence of such a publication, was to subscribe a proportional sum, for which they were to receive one or more copies of each piece published. For this end, three societies are settled; one under F. Moro, provincial of the Minorites in Hungary; another under the abbot Laurence au Rue Payenne au Marais; the third under F. Baldigiani, Jesuit, professor of mathematics in the Roman college. The device of this academy is the terraqueous globe, with the motto *Plus ultra*; and at its expence all the globes, maps, and geographical writings, of F. Coronelli have been published.

V. *Academies of SCIENCES*.—These comprehend such as are erected for improving natural and mathematical knowledge. They are otherwise called *Philosophical* and *Physical Academies*.

The first of these was instituted at Naples, about the year 1560, in the house of Baptista Porta. It was called the *Academy Secretorum Naturæ*; and was succeeded by the *Academy of Lyncei*, founded at Rome by Prince Frederic Cesi, towards the end of that century. Several of the members of this academy rendered it famous by their discoveries; among these was the celebrated Galileo. Several other academies were instituted about that time, which contributed greatly to the advancement of the sciences; but none of them comparable to that of the *Lyncei*.

Some years after the death of Toricelli, the *Academy del Cimento* made its appearance, under the protection of Prince Leopold, afterwards Cardinal de Medici. Redi was one of its chief members; and the studies pursued by the rest may be collected from those curious experiments published in 1667, by their secretary Count Laurence Magulotti, under the title of *Saggi di Naturali Esperienze*; a copy of which was presented to the Royal Society, translated into English by Mr Waller, and published at London in 4^{to}.

The *Academy degli Inquieti*, afterwards incorporated into that of Della Traccia in the same city, followed the example of that of Del Cimento. Some excellent discourses

* See School.

* See Society, the general term with us for establishments of this kind.

* See Catalogue.

courses on physical and mathematical subjects, by Geminiano Montenari, one of the chief members, were published in 1667, under the title of *Pensieri Fisico Matematici*.

The *Academy of Rossano*, in the kingdom of Naples, was originally an Academy of Belles Lettres, founded in 1540, and transformed into an Academy of Sciences in 1695 at the solicitation of the learned abbot Don Giacinto Gimma; who being made president, under the title of Promoter General thereof, gave them a new set of regulations. He divided the academists into the following classes: Grammarians, Rhetoricians, Poets, Historians, Philosophers, Physicians, Mathematicians, Lawyers, and Divines, with a class apart for Cardinals and persons of quality. To be admitted a member, a man must have some degrees in the faculty. The members are not allowed to take the title of *Academists* in the beginning of their books, without a written permission from their president, which is not granted till the work has been examined by the censors of the Academy; and the permission is the greatest honour the Academy can confer, as they thereby adopt the work, and are answerable for it against all criticisms that may be made upon it. To this law the president or promoter himself is subject; and no academist is allowed to publish any thing against the writings of another, without leave from the society.

Several other Academies of *Sciences* have been founded in Italy; but, for want of being supported by princes did not continue long. The loss of them, however, was abundantly repaired by the institution of others still subsisting; such as, the *Academy of Filarmenici* at Verona; of *Ricovatri* at Padua, where a learned discourse on the origin of springs was delivered by Sig. Vallisneri, first professor of physic in the university of that city, and which was afterwards printed. To the Academy of the *Musi de Reggio*, at Modena, the same Sig. Vallisneri presented an excellent discourse on the scale of created beings, since inserted in his history of the generation of man and animals printed at Venice in the year 1721.

F. Merenne is said to have given the first idea of a philosophical Academy in France, towards the beginning of the 17th century, by the conferences of naturalists and mathematicians occasionally held at his lodgings; at which Gassendi, Des Cartes, Hobbes, Roberval, Pascal, Blondel, and others assisted. F. Merenne proposed to each certain problems to examine, or certain experiments to be made. These private assemblies were succeeded by more public ones, formed by Mr. Montmort, and Mr. Thievenot the celebrated traveller. The French example animated several Englishmen of distinction and learning to erect a kind of philosophical academy at Oxford, towards the close of Oliver Cromwell's administration; which, after the Restoration, was erected into a Royal Society*. The English example, in its turn, animated the French. Lewis XIV. in 1666, assisted by the counsels of Mr. Colbert, founded an Academy of Sciences at Paris, with a sufficient revenue to defray the charge of experiments, and salaries to the members.

Royal Academy of Sciences. After the peace of the Pyrenees, Lewis XIV. being desirous of establishing the arts, sciences, and literature, upon a solid foundation, directed M. Colbert to form a society of men of

known abilities and experience in the different branches, who should meet together under the king's protection, and communicate their respective discoveries. Accordingly Mr. Colbert, having conferred with those who were at that time most celebrated for their learning, resolved to form a society of such persons as were conversant in natural philosophy and mathematics, to join to them other persons skilled in history and other branches of erudition, along with those who were entirely engaged in what are called the *Belles Lettres*, grammar, eloquence, and poetry. The geometers and natural philosophers were ordered to meet on Tuesdays and Saturdays, in a great hall of the king's library, where the books of mathematics and natural philosophy were contained; the learned in history to assemble on Mondays and Thursdays, in the hall where the books of history were contained; and the class of Belles Lettres to assemble on Wednesdays and Fridays. All the different classes were likewise ordered to meet together upon the first Thursday of every month; and, by their respective secretaries, make a report of the proceedings of the foregoing month.

In a short time, however, the classes of History, Belles Lettres, &c. were united to the *French Academy*, which was originally instituted for the improvement and refining the French language, so that the royal Academy contained only two classes, *viz.* that of natural philosophy and mathematics.

In year 1696, the king, by a proclamation dated the 26th of January, gave this Academy a new form, and put it upon a more respectable footing.—It was now to be composed of four kinds of members, *viz.* honorary, pensionary associates, and clerics. These last were a kind of pupils, or scholars, each of whom was attached to one of the pensionaries. The first class to contain ten persons, and each of the rest twenty. The honorary academists to be all inhabitants of France; the pensionaries all to reside at Paris; eight of the associates allowed to be foreigners; and the clerics all to live at Paris. The officers to be, a president named by the king, out of the class of honorary academists; and a secretary and treasurer to be perpetual. Of the pensionaries, three to be geometers, three astronomers, three mechanics, three anatomists, three chemists, three botanists, and the remaining two to be secretary and treasurer. Of the twelve associates, two to apply themselves to geometry, two to botany, and two to chemistry. The clerics to apply themselves to the same kind of science with the pensionaries they were attached to; and not to speak, except when called by the president. No regular or religious to be admitted, except into the class of honorary academists; nor any person to be admitted either for associate or pensionary, unless known by some considerable printed work, some machine, or other discovery. The assemblies were held on Wednesdays and Saturdays, unless either of them happened to be a holiday, and then the assembly was held on the preceding day.—To encourage the members to pursue their labours, the king engaged not only to pay the ordinary pensions, but even to give extraordinary gratifications, according to the merit of their respective performances; furnishing withal the expence of the experiments and other inquiries necessary to be made. If any member gave in a bill of charges of experiments he had made, or desired the printing of any book, and brought

* See Society.

brought in the charges of graving, the money was immediately paid by the king, upon the president's allowing and signing the bill. So, if an anatomist required live tortoises, for instance, for making experiments about the heart, &c. as many as he pleased were brought him at the king's charge. Their motto was, *Invenit et perficit*.

In the year 1716, the duke of Orleans, then regent, made an alteration in their constitution; augmenting the number of honoraries, and of associates capable of being foreigners, to 12; admitting regulars among such associates; and suppressing the class of elves, as it appeared to be attended with some inconveniences, particularly that of making too great an inequality among the Academists, and being productive of some misunderstandings and animosities among the members. At the same time he created other two classes; one consisting of 12 adjutants, who, as well as the associates, were allowed a deliberative voice in matters relative to science; and the other six free associates, who were not attached to any particular science, nor obliged to pursue any particular work.

Since its re-establishment in 1699, this Academy has been very exact in publishing, every year, a volume containing either the works of its own members, or such memoirs as have been composed and read to the Academy during the course of that year. To each volume is prefixed the history of the Academy, or an extract of the memoirs, and, in general, of whatever has been read or said in the Academy; at the end of the history, are the eulogiums on such Academists as have died that year.—M. Rouille de Messay, counsellor to the parliament of Paris, founded two prizes, one of 2500, and the other of 2000 livres, which are alternately distributed by the parliament every year; the subject for the first must relate to physical astronomy, and those for the latter to navigation and commerce.

Notwithstanding the advantages which the members of this Academy enjoy over others, in having their expences defrayed, and even being paid for their time and attendance, they have fallen under some imputations, particularly that of plagiarism, or borrowing their neighbours inventions; but with what justice we do not say.

The *Royal Society at Berlin* was founded in 1700, by Frederic II. king of Prussia, on the model of that of England; excepting that, besides natural knowledge, it likewise comprehends the Belles Lettres. In 1710, it was ordained that the president shall be one of the counsellors of state, and nominated by the king. The members were divided into four classes; the first for prosecuting physics, medicine, and chemistry; the second for mathematics, astronomy, and mechanics; the third for the German language and the history of the country; the fourth for oriental learning, particularly as it may concern the propagation of the gospel among infidels. Each class to elect a director for themselves, who shall hold his post for life. The members of any of the classes have free admission into the assemblies of any of the rest.

The great promoter of this institution was the celebrated Mr Leibnitz, who accordingly was made the first director. The first volume of their transactions was published in 1710, under the title of *Miscellanea Berolinensia*; and though they received but few marks

of the royal favour for some time, they continued to publish new volumes in 1723, 1727, 1734, and 1740. At last, however, Frederic III. the present king of Prussia, gave new vigour to this Academy, by inviting to Berlin such foreigners as were most distinguished for their merit in literature, and encouraged his subjects to prosecute the study and cultivation of the sciences by giving ample rewards; and thinking that the Academy, which till that time had had some minister or opulent nobleman for its president, would find an advantage in having a man of letters at its head, he conferred that honour on M. Maupertuis. At the same time, he gave a new regulation to the academy, and took upon himself the title of its protector.

The academists hold two public assemblies annually; one in January, on the present king's birth-day; and the other in May, on the day of his accession to the throne. At the latter of these is given, as a prize, a gold medal of 50 ducats value: the subject for this prize is successively, natural philosophy, mathematics, metaphysics, and erudition.

The *Imperial Academy at Petersburg* was projected by Czar Peter the Great, who had taken the necessary measures for its establishment, when he was prevented by death from putting them into execution. His successor, the Czarina Catherine, laboured on the same plan; and in a short time formed one of the most celebrated academies in Europe, composed of the most considerable foreigners, some of them settled at Petersburg. The memoirs of this academy, which are published in Latin, are highly valuable, particularly for the mathematical part. The Academy, however, was in a very languishing condition, when the empress Czarina Elisabeth ascended the throne; but that princess, happily, naming count Rasumowski president, he gave it a new body of statutes, and quickly restored it to its ancient splendor.

The building and apparatus of this academy are extraordinary, there being a fine library, observatory, &c. It partakes much of what we call an *University*; having regular professors in the several faculties, who read lectures as in our schools.—The ordinary assemblies are held twice a-week, and public or solemn ones thrice a-year. In the public assemblies an account is given of what has been done in the private ones. The Academy has this model motto, *Paulatim*.

The *Academy of Sciences*, called the *Institute of Bologna*, was founded by count Marigli in 1712, for the cultivating of physics, mathematics, medicine, chemistry, and natural history. Its history is written by M. de Limiers, from memoirs furnished by the founder himself.

VI. *Academies of Law*; as that famous one at Beryta, and that of the Sitientes at Bologna.

VII. *Academies of History*; as the *Royal Academy of Portuguese History* at Lisbon. This Academy was instituted by King John V. in 1720. It consists of a director, four censors, a secretary, and 50 members; to each of which is assigned some part of the ecclesiastical or civil history of the nation, which he is to treat either in Latin or Portuguese. In the church-history of each diocese, the prelates, synods, councils, churches, monasteries, academies, persons illustrious for sanctity or learning, places famous for miracles or relics, must be distinctly related in twelve chapters. The civil history

Academies. ry comprises the transactions of the kingdom from the government of the Romans down to the present time. The members who reside in the country are obliged to make collections and extracts out of all the registers, &c. where they live. Their meetings to be once in fifteen days.

A medal was struck by this Academy, in honour of their prince: the front of which was his effigy, with the inscription *Johannes V. Lusitanorum Rex*; and, on the reverse, the same prince is represented standing, and raising History almost prostrate before him, with the legend *Historia Resurgens*. Underneath are the following words in abbreviation: REGIA ACADemia HISTORIE LUSITANÆ, INSTITuta VI. Idus Decembris MDCCXX.

VIII. *Academies of ANTIQUITIES*; as that at Cortona in Italy, and at Upsal in Sweden. The first is dignified for the study of Etrurian antiquities; the other for illustrating the northern languages, and the antiquities of Sweden, in which notable discoveries have been made by it. The head of the Etrurian Academy is called *Lucemon*, by which the ancient governors of the country were distinguished. One of their laws is to give audience to poets only one day in the year; another is to fix their sittings, and impose a tax of a dissertation on each member in his turn.

The *Academy of Medals and Inscriptions* at Paris was set on foot by M. Colbert, under the patronage of Lewis XIV. in 1663, for the study and explanation of ancient monuments, and perpetuating great and memorable events, especially those of the French monarchy, by coins, reliefs, inscriptions, &c. The number of members at first was confined to four or five, chosen out of those of the French Academy; who met in the library of Mr. Colbert, from whom they received his majesty's orders. The days of their meetings were not determined; but generally they met on Wednesdays, especially in the winter season: but, in 1691, the king having given the inspection of this academy to M. de Pontchartrain comptroller general, &c. he fixed their meetings on Tuesdays and Saturdays.

By a new regulation, dated the 16th of July 1701, the Academy was composed of ten *honorary* members; ten *associates*, each of whom had two declarative voices; ten *personaries*; and ten *elèves*, or pupils. They then met every Tuesday and Wednesday, in one of the halls of the Louvre; and had two public meetings yearly, one the day after Martinmas and the other the 16th after Easter. The class of *elèves* has been suppressed, and united to the associates. The king nominates their president and vice-president yearly; but their secretary and treasurer are perpetual. The rest are chosen by the members themselves, agreeably to the constitutions on that behalf given them.

One of the first undertakings of this Academy, was to compose, by means of medals, a connected history of the principal events of Lewis XIV.'s reign: but in this design they met with great difficulties, and of consequence it was interrupted for many years; but at length it was completed down to the advancement of the duke of Anjou to the crown of Spain.

In this celebrated work, the establishment of the Academy itself was not forgot. The medal on this subject represents Mercury sitting, and writing with an

antique stylus on a table of brass; he leans with his left hand upon an urn full of medals, and at his feet are several others placed upon a card: the legend, *Rerum gestarum fides*; and on the exergue, *Academia regia inscriptionum et numismatum, instituta M.DC.LXIII.* signifying that the Royal Academy of Medals and Inscriptions, founded in 1663, ought to give to future ages a faithful testimony of all great actions. Besides this work, we have several volumes of their memoirs; and their history, written and continued by their secretaries.

IX. *Academies of BELLES LETTRES*, are those wherein eloquence and poetry are chiefly cultivated. There are very numerous in Italy, and not uncommon in France.

The *Academy of Umidi* at Florence has contributed greatly to the progress of the sciences by the excellent Italian translations given, by some of its members, of the ancient Greek and Latin historians. Their chief attention is to the Italian poetry, at the same time that they have applied themselves to the polishing of their language, which produced the *Academy La Crusca*.

The *Academy of Humorists*, *Umoristi*, had its origin at Rome from the marriage of Lorenzo Marcin, a Roman gentleman; at which several persons of rank were guests; and, it being carnival time, to give the ladies some diversion, they took themselves to the reciting of verses, sonnets, speeches, first *ex tempore*, and afterwards premeditated; which gave them the denomination of *Belli Humori*. After some experience, coming more and more into the taste of their exercises, they resolved to form an Academy of Belles Lettres; and changed the title of *Belli Humori* for that of *Humoristi*: chusing for their device a cloud, which, after being formed of exhalations from the salt waters of the ocean, returns in a gentle sweet shower; with this motto from Lucretius, *Reddit agmine dulci*.

In 1690, the *Academy of Arcadi* was established at Rome, for reviving the study of Poetry and of the Belles Lettres. Besides most of the politer wits of both sexes in Italy, this academy comprehends many princes, cardinals, and other ecclesiastics; and, to avoid disputes about pre-eminence, all appear masked after the manner of Arcadian shepherds. Within ten years from its first establishment, the number of *Academists* amounted to six hundred. They hold assemblies seven times a-year in a mead or grove, or in the gardens of some nobleman of distinction. Six of these meetings are employed in the recitation of poems and verses of the Arcadi residing at Rome; who read their own compositions; except ladies and cardinals, who are allowed to employ others. The seventh meeting is set apart for the compositions of foreign or absent members.

This academy is governed by a Custos, who represents the whole society, and is chosen every four years, with a power of electing 12 others yearly for his assistance. Under these are two sub-custodes, one vicar or pro-custos, and four deputies or superintendants, annually chosen. The laws of the society are immutable, and bear a near resemblance to the ancient model.

There are five manners of electing members. The first is by *acclamation*. This is used when sovereign princes, cardinals, and ambassadors of kings, desire to be

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be admitted; and the votes are then given *viva voce*. The second is called *annumeration*. This was introduced in favour of ladies and academical colonies, where the votes are taken privately. The third, *representation*, was established in favour of colonies and universities, where the young gentry are bred; who have each a privilege of recommending one or two members privately to be ballotted for. The fourth, *surrogation*, whereby new members are substituted in the room of those dead or expelled. The last, *destination*; whereby, when there is no vacancy of members, persons of poetical merit have the title of Arcadi conferred upon them, till such time as a vacancy shall happen. All the members of this body, at their admission, assume new pastoral names, in imitation of the shepherds of Arcadia. The academy has several colonies of Arcadi in different cities of Italy, who are all regulated after the same manner.

X. ACADEMIES of Languages; called, by some, *Grammatical Academies*; as,

The *Academy della Crusca* at Florence, famous for its vocabulary of the Italian tongue, was formed in 1582, but scarce heard of before the year 1584, when it became noted for a dispute between Tasso and several of its members. Many authors confound this with the Florentine academy. The discourses which Toricelli, the celebrated disciple of Galileo, delivered in the assemblies, concerning levity, the wind, the power of percussion, mathematics, and military architecture, are a proof that these academists applied themselves to things as well as words.

The *Academy of Frustifiers* had its rise in 1617, at an assembly of several princes and nobility of the country, who met with a design to refine and perfect the German tongue. It flourished long under the direction of princes of the empire, who were always chosen presidents. In 1668, the number of members arose to upwards of 900. It was prior in time to the French academy, which only appeared in 1629, and was not established into an academy before the year 1635. Its history is written in the German tongue, by George Neumarck.

The *French Academy*, which had its rise from a meeting of men of letters in the house of M. Conrart, in 1629. In 1635, it was erected into an academy, by Cardinal Richlieu, for refining and ascertaining the French language and style.—The number of its members are limited to 40; out of whom a director, chancellor, and secretary, are to be chosen: the two former hold their post for two months, the latter is perpetual. The members of this academy enjoy several privileges and immunities, among which is that of not being obliged to answer before any court but that of the king's household. They meet three times a-week in the Louvre; at breaking up, forty silver medals are distributed among them, having on one side the king of France's head, and on the reverse, *Protecteur de l'Academie*, with laurel, and this motto, *A l'Immortalité*. By this distribution, the attendance of the *Academists* is secured, those who are present receiving the surplus otherwise intended for the absent. To elect or expel a member, at least eighteen are required; nor can any be chosen unless he petition for it: by this expedient, the affront of refusals from persons elected is avoided. Religious are not admitted; nor can any nobleman, or person of distinction,

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be admitted on another footing than as a man of letters. None are to be expelled, except for base and dishonest practices; and there are but two instances of such expulsions, the first of M. Granier for refusing to return a deposit the other of the Abbe Furetiere for plagiarism.—The design of this academy was to give not only rules, but examples, of good writing. They began with making speeches on subjects taken at pleasure, about twenty of which were printed. They met with great opposition from the parliament at their first institution; it being two years before the patents granted by the king would be registered. They have been severely satyrized, and their style has been ridiculed as enervating instead of refining the French language. They are also charged with having surreitised the world by flattery, and having exhausted all the topics of panegyric in praise of their founder; it being a duty incumbent on every member, at his admission, to make a speech in praise of the king, the cardinal, the chancellor Seguier, and the person in whose place he is elected. The most remarkable work of this academy is a dictionary of the French tongue; which, after 50 years spent in settling the words and phrases to be used in writing, was at last published in 1694.

The *Royal Spanish Academy* at Madrid held its first meeting in July 1713, in the palace of its founder, the duke d' Escalona. It consisted at first of eight Academists, including the duke; to which number 14 others were afterwards added, the founder being chosen president or director. In 1714, the king granted them his confirmation and protection. Their device is a crucible in the middle of the fire, with this motto, *Limpia, Fy, y da Esplendor*; "it purifies, fixes, and gives brilliancy." The number of members is limited to 24; the duke d' Escalona to be director for life, but his successors chosen yearly, and the secretary to be perpetual. Their object, as marked out by the royal declaration, was to cultivate and improve the national language: they were to begin with chusing carefully such words and phrases as have been used by the best Spanish writers; noting the low, barbarous, or obsolete ones; and composing a dictionary wherein these may be distinguished from the former.

XI. ACADEMIES of Dancing; as that erected by Lewis XIV. with privileges above all the rest.

XII. ACADEMIES of Painting; as the *Academy of Painting and Sculpture* at Paris. This took its rise from the disputes that happened between the master painters and sculptors in that capital; in consequence of which, M. Le Brun, Sarazin, Comille, and others of the king's painters, formed a design of instituting a particular academy; and, having presented a petition to the king, obtained an arret dated Jan. 20. 1648. In the beginning of 1655, they obtained from cardinal Mazarin a brevet, and letters patent, which were registered in parliament; in gratitude for which favour, they chose the cardinal for their protector, and the chancellor for their vice-protector. In 1663, by means of M. Colbert, they obtained a pension of 4000 livres. The academy consists of a protector; a vice-protector; a director; a chancellor; four rectors; adjuncts to the rectors; a treasurer; four professors, one of which is professor of anatomy, and another of geometry; several adjuncts and counsellors, an historiographer, a secretary, and two ushers.

The

Academies.

Acadlandrus.

The Academy of Painting holds a public assembly every day for two hours in the afternoon, to which the painters resort either to design or to paint, and where the sculptors model after a naked person. There are 12 professors, each of whom keeps the school for a month; and there are 12 adjuncts to supply them in case of need. The professor upon duty places the naked man as he thinks proper, and sets him in two different attitudes every week. This is what they call *setting the model*. In one week of the month he sets two models together, which is called *setting the group*. The paintings and models made after this model, are called *academies*, or *academy-figures*. - They have likewise a woman who stands for a model in the public school. Every three months, three prizes for design are distributed among the *elevés* or disciples; two others for painting, and two for sculpture, every year.

There is also an Academy of Painting, Sculpture, &c. at Rome, established by Lewis XIV. wherein those who have gained the annual prize at Paris are entitled to be three years entertained at the king's expense, for their further improvement.

XIII. *Academies of ARCHITECTURE*; as that established by M. Colbert in 1671, consisting of a company of skilful architects, under the direction of the superintendent of the buildings.

XIV. *Academies of POLITICS*; as that at Paris, consisting of six persons, who met at the Louvre, in the chamber where the papers relating to foreign affairs were lodged. But this Academy proved of little service, as the kings of France were unwilling to trust any but their ministers with the inspection of foreign affairs.

ACADEMY is also a term for schools and other seminaries of learning among the Jews, where their rabbins and doctors instructed their youth in the Hebrew language, and explained to them the Talmud and the secrets of the Cabbala: Those of Tiberias and Babylon have been the most noted.

ACADEMY is often used with us to denote a kind of collegiate school, where youth are instructed in arts and sciences. There is one at Portsmouth for teaching navigation, drawing, &c.; another at Woolwich, for fortification, gunnery, &c.—Besides these, there are numerous academies, especially in London, for teaching mathematics, languages, writing, accounts, drawing, and other branches of learning.

ACADEMY is likewise a name given to a riding-school, where young gentlemen are taught to ride the great horse, &c. and the ground allotted is usually called the *Menage*.

ACADEMY *Figure*, a drawing of a naked man or woman, taken from the life, which is usually done on paper with red or black chalk, and sometimes with pencils or crayons*. See ACADEMY, No XII. par. 2. *supra*.

ACADIE, or ACADY, in geography, a name formerly given to Nova Scotia, or New Scotland, one of our American colonies. See NOVA SCOTIA.

ACENA, in antiquity, a Grecian measure of length, being a ten feet-rod, used in measuring their lands.

ACAJOU, or CASHEW-NUT-TREE. See ANACARDIUM.

ACALANDRA, a town of Lucania, on the other side the Apennine, (Strabo); now *Salandra*, in the Basilicata, on the river Acalandrus.

ACALANDRUS, a river falling into the bay of Ta-

rentum, not far from the Metapontum, (Pliny, Strabo); now *Fiume de Rofeto*.

ACALEPTIC, in ancient prosody, a complete verse.

ACALYPHA, the Three-headed Mercury, in botany, a genus of plants belonging to the monœcia monadaphia class. There are only four species of this plant; the acalypha virginica, which is a native of Ceylon; the virgata, indica, and australis, all natives of America. Sir Hans Sloan ranks this plant with the nettle, under the name of *urtica minor iners spicata*. As these plants have no beauty to recommend them, and at the same time are too tender to thrive easily in this climate, a particular description of the species or their culture seems unnecessary.

ACAMANTIS, the ancient name of the island Cyprus, taken from one of its promontories, situate to the west.

ACAMAS, son of Theusus, followed the rest of the Grecian princes to the siege of Troy; and was deputed, with Diomedes, to the Trojans, in order to get Helen restored. - Laodice, Priam's daughter, fell in love with him, stole a night with him, and had a son by him called Munitus. He was one of the heroes who concealed themselves in the wooden horse. One of the tribes of Athens was called *Acamantides* from him, by the appointment of the oracle. He founded a city in Phrygia Major, called *Acamantium*; and made war against the Solymns.

ACAMBOU, a kingdom of Africa, on the coast of Guinea.

ACANACEOUS PLANTS, such as are armed with prickles.

ACANGIS, that is, *Ravagers* or *Adventurers*; a name which the Turks give their hussars or light-troops, who are generally sent out in detachments to procure intelligence, harass the enemy, or ravage the country.

ACANTHA, in botany, the prickly of any plant; in zoology, a term for the spine or prickly fins of fishes.

ACANTHABOLUS, in surgery, an instrument for pulling thorns, or the like, out of the skin.

ACANTHINE, any thing resembling or belonging to the herb acanthus. Acanthine garments, among the ancients, are said to be made of the down of thistles; others think they were garments embroidered in imitation of the acanthus.

ACANTHOPTERYGIOUS FISHES, a term used by Linnæus and others for those fishes whose back-fins are hard, scissous, and prickly.

ACANTHOS, a town of Egypt, near Memphis, (Pliny); now *Bifalta*. Also a maritime town of Macedonia, to the west of mount Athos, a colony of Andrians, (Thucydides, Ptolemy); now *Erisso*; near which was shewn Xerxes's ditch, of seven stadia, in order to separate mount Athos from the continent, and convey his ships, without doubling Athos, into the Singitic Bay. *Acanthos*, is also a town of Epirus.

ACANTHUS, bear-breech, or brank-ursine, in botany; a genus of plants of the angiospermia order belonging to the didynamia class. For the figure of this plant, which is extremely beautiful, see Plate I. fig. 3. There are five.

Species. 1. The mollis, or common bear's-breech, a native of Italy, is the sort that is used in medicine*, * See *Methodus Medica*, and is supposed to be the *mollis acanthus* of Virgil: No 68.

* See *Crayon-painting*.

Acaleptic

Acanthus.

Acanthus
Acapulco.

† See Architecture,
n° 15, 25.

the leaves of this species are famous for having given rise to the capital of the Corinthian pillars †. 2. The spinosus, or prickly bear's-breech; the leaves of which are deeply jagged in very regular order, and each segment is terminated with a sharp spine, as are also the footstalks of the leaves and the empalement of the flower, which renders it troublesome to handle them. 3. Illicifolius, or shrubby bear's-breech, grows naturally in both the Indies. It is an evergreen shrub, which rises about four feet high; and is divided into many branches, garnished with leaves like those of the common holly, and armed with spines in the same manner: the flowers are white, and shaped like those of the common acanthus, but smaller. 4. The nigra, or Portugal bear's-breech, with smooth sinuated leaves of a livid green colour, was discovered in Portugal by Dr Jussieu of the royal garden at Paris. 5. The middle bear's-breech, with entire leaves, having spines on their border, is supposed to be the acanthus of Dioscorides.

Culture. They are all perennial plants. The first and second species may be propagated either by seeds, or by off-sets from the roots. The best way is to raise them from the seeds; which should be sown about the end of March, in a light soil. They are best dropped at distances into shallow drills, and covered three quarters of an inch with mould. When the plants are come up, the strongest should be marked, and the rest should be pulled up, that these may stand at a yard distance one from another. They require no other culture, but to keep them clear from weeds. The third, fourth and fifth sorts, are propagated only by seeds; which, as they do not ripen in Europe, must be obtained from the places in which they grow naturally: the plants are so tender, that they cannot be preserved out of the stove in this country.

ACANTHUS is likewise used by Theophrastus as a synonyme of the acacia.

ACANTHUS, in architecture, an ornament representing the leaves of the acanthus, used in the capitals of the Corinthian and Composite orders.

ACANUS, in botany, a synonyme of carduus cassi-bone of Linnaeus. See CARDUS.

ACAPULCO, a considerable town and port in Mexico, on the South Sea. It has a fine harbour, from whence a ship annually sails to Manila in the Philippine islands, near the coast of China in Asia: and another returns annually from thence with all the treasures of the East Indies, such as diamonds, rubies, sapphires, and other precious stones; the rich carpets of Persia; the camphire of Borneo; the benjamin and ivory of Pegu and Cambodia; the silks, muslins, and calicoes, of the Mogul's country; the gold-dust, tea, china-ware, silk, and cabinets, of China and Japan; besides cinnamon, cloves, mace, nutmegs, and pepper; inasmuch that this single ship contains more riches than many whole fleets. The goods brought to Acapulco are carried to the city of Mexico by mules and pack-horses; and from thence to Vera Cruz on the North Sea, in order to be shipped for Europe. Acapulco itself is a small place, consisting of about 2 or 300 thatched houses. Ships arrive at the port by two inlets, separated from each other by a small island; the entrance into them in the day-time is by means of a sea-breeze, as the falling out in the night-time is effected by a land-breeze. A wretched fort, 42 pieces of cannon, and a garrison of 60 men,

defend it. It is equally extensive, safe, and commodious. The bason which constitutes this harbour is surrounded by lofty mountains, which are so dry, that they are even destitute of water. The air here is hot, heavy, and unwholesome; to which none can habituate themselves, except certain negroes that are born under a similar climate, or some mulattoes. This feeble and miserable colony is crowded with a vast accession to its numbers upon the arrival of the galleons; traders flocking here from all the provinces of Mexico, who come to exchange European toys, their own cochineal, and about ten millions † of silver for spices, muslins, printed linens, silk, perfumes, and the gold works of Asia. W. Long. 102. 29. N. Lat. 17. 30.

ACARAI, a town of Paraguay in South America, built by the Jesuits in 1624. Long. 116. 40. S. lat. 26°.

ACARAUNA, a small American fish, called by our sailors the old-wife. See LABRUS.

ACARNANIA, the first country of Free Greece, or Greece Proper, bounded on the west by the Sinus Ambracius, and separated from Ætolia by the river Achelous on the east, and by the Sinus Ambracius from Epirus. The people were called *Acarnanes*, denoting persons unborn; other Etolians, to the east of the Achelous, being called *Curetes*, (Homer,) from being thorn. According to Lucian, they were noted for effeminacy and incontinence; hence the proverb, *Porcellus Acarnanius*. This country was famous for an excellent breed of horses; so that *Acarnæus iuvæus*, is a proverbial saying for a thing excellent in its kind. It is now called *la Carnia* and *il Despotato*.

ACARON, or ACCARON, a town of Palestine, called *Etron* in scripture. It was the boundary of the Philistines to the north; stood at some distance from the sea, near Bethshemesh; and was famous for the idol of Baalzebub.

ACARUS, a genus of insects belonging to the order of aptera, or such as have no wings. The acarus has eight legs, two eyes, one on each side of the head, and two jointed tentacula. Most of the species of this genus have been also arranged among the microscopic animalcules, but with no reason; they are all sufficiently visible to the naked eye. The term *Acarus* is not to be understood, in this sense, as restrained to the insect commonly understood by it, the Mite: that animal is possessed of characters in common with a great number of other insects, which have been called by other names, but which are all connected by nature, and are therefore of the same genus; some of them have been called spiders, others lice, and others by other names, referring them to genera to which they have as little alliance in nature as to these. The genus, on bringing them back to it, appears a very numerous one *, and consists of some which are inhabitants of the earth, some of waters; some which live on trees, others among stones, and others on the bodies of other animals, and even under their skin. The description of a few of the most remarkable will here suffice.

1. The fire, or cheese-mite, is a very minute species. To the naked eye, these mites appear like moving particles of dust. But the microscope discovers them to be perfect animals, having as regular a figure, and performing all the functions of life as perfectly, as creatures that exceed them many times in bulk. The principal parts of them are the head, the neck, and the body.

The

Acara
Acarus.

† £437,500
Sterling.

* Linnaeus
enumerates
35 species.

The Cheese-
mite, &c.

Acarus.

The head is small in proportion to the body; and has a sharp snout, and a mouth that opens and shuts like a mole's. They have two small eyes, and are extremely quicksighted; and when they have been once touched with a pin, you will easily perceive how cunningly they avoid a second touch. Their legs are each furnished at the extremity with two little claws, with which the animal very nicely takes hold of any thing. The hinder part of the body is plump and bulky; and ends in an oval form, from which there issue out a few exceeding long hairs. Other parts of the body are also beset with thin and long hairs. The males and females are easily distinguished in these little animals. The females are oviparous, as the louse and spider; and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are however, when first hatched, extremely minute; and, in their growing to their full size, they cast their skins several times. These little creatures may be kept alive many months between two concave glasses, and applied to the microscope at pleasure. They are thus often seen *in coltu*, conjoined tail to tail; and this is performed by an incredibly swift motion. Their eggs, in warm weather, hatch in twelve or fourteen days; but, in winter, they are much longer. These eggs are so small, that a regular computation shews, that 90 millions of them are

not so large as a common pigeon's egg *. They are very voracious animals, and have often been seen to eat one another. Their manner of eating is by thrusting alternately one jaw forward and the other backward, and in this manner grinding their food; and after they have done feeding, they seem to chew the cud. There are several varieties of this species found in different substances besides cheese; as in malt-dust, flour, oat-meal, &c. Those in malt-dust and oat-meal are much number than the cheese-mites, and have more and longer hairs. There are also a sort of wandering mites, which range wherever there is any thing they can feed on: They are often seen in the form of a white dust, and are not supposed to be living creatures.—The mite is called by authors, simply, *Acarus*. It is an animal very tenacious of life, and will live months without food.

Mr Lewenhoeck * had one which lived eleven weeks on the point of a pin, on which he had fixed it for examining by his microscope.—2. The sanguifugus. The hinder part of the abdomen is cruciated, the scutellum is oval and yellowish, and the beak is trifid. It is a native of America, and sticks so fast on the legs of travellers, sucking their blood, that they can hardly be extracted. 3. The telarius is of a greenish yellow colour. It has a small sting or weapon, with which it wounds the leaves of plants, and occasions them to fold backward. They are very frequently to be met with in the autumn, inclosed in the folded leaves of the lime-tree. 4. The exulcerans, or itch-acarus, is a very small species; its body is of a figure approaching to oval, and lobated; the head is small and pointed; its colour is whitish, but it has two dusky femicircular lines on the back. It has long setaceous legs, but the two first are short. It is found in the pulstules of the itch: authors in general have supposed that it causes that disease; but, if this were so, it would be found more universally in those pulstules. It is more probable that these only make a proper nidus for it. 5. The

batatas, is of a blood-colour, and a little rough; the fore pair of legs are as long as the body. It inhabits the potatoes of Surinam. 6. The ovinus, or sheep-tick, has a flat body, of a roundish figure, but somewhat approaching to oval, and of a yellowish white colour, and has a single large round spot on the back: the anus is visible in the lower part of the body; the thorax is scarce conspicuous; the head is very small and black; the mouth is bifid: the antennæ are of a clavated figure, and of the length of the snout; the legs are short and black. It is common on sheep, and its excrements stain the wool green: it will live in the wool many months after it is shorn from the animal. 7. The coleoptratorum, or acarus of insects, is extremely minute: its body is round, reddish, and covered with a firm and hard skin; the head is very small, the neck scarce visible; the legs are moderately long, the anterior pair longer than the others; it has a whiteness about the anus. It is frequent on the bodies of many insects, which it infests, as the louse does others; it runs very swiftly: the humble-bee, and many other of the larger insects, are continually infested with it; but none so much as the common black beetle, which has thence been called the lousy beetle. 7. The baccharum, or scarlet tremite, is a small species: its body is roundish, and the back not at all flattened, as it is in many others; the skin is smooth, shining, and glossy; and the whole animal seems distended, and ready to burst; the colour is a bright red, but a little dusker on the sides than elsewhere: the head is very small, and the legs short; there is on each side a small dusky-spot near the thorax, and a few hairs grow from different parts of the body. It is very common on trees, particularly on the currant, on the fruit of which we frequently see it running. 9. The longicornis, or red stone-acarus, is very small, and of a bright red colour; the body is round, and distended; the head is very small, and pointed; the legs are moderately long, and of a paler red than the body: the antennæ are much longer than in any other species. It is frequent about old stone-walls and on rocks, and runs very nimbly. 10. The aquaticus is a small species: the body is of a figure approaching to an oval, and the back appears depressed; it is of a bright and strong scarlet colour. The head is small; the legs are moderately long and firm, and are of a paler red than the body. It is common in shallow waters, where it runs very swiftly along the bottom. 11. The holosericus is a small species: its body is roundish, but a little approaching to oval; the back somewhat depressed: it is of a fine scarlet colour, and covered with a velvety down. The head is very small; the eyes are two, and very small; the legs are short and of a paler red, and there is a small black spot near the insertion of the anterior ones. It is very common under the surface of the earth, and sometimes on herbs and among hay. It is supposed to be poisonous, if swallowed; but we do not seem to have any certain account of such an effect. 12. The longipes is the largest of the acarus kind: its body is roundish, of a dusky brown on the back, with a dusker spot of a rhomboidal figure near the middle of it; the belly is whitish; the legs are extremely long and slender. On the back part of the head there stands a little eminence, which has on it a kind of double crest, formed as it were of a number of minute spines: the eyes are small and black, and are

Acarus.

Acarus
of
insects.Long-leg'd
Acarus.
Pl. I. fig. 4.

Acclius
Accele-
ration.

two in number. It is very common in our pastures, towards the end of summer. Ray and Lister call it *araneus crustatus longipes*; Mouffet, *araneus longipes*; and, notwithstanding its having but two eyes, it has been almost universally ranked among the spiders.

ACASTUS, in classic history, the son of Pelias king of Thessaly, and one of the most famous hunters of his time, married Hippolyta, who falling desperately in love with Peleus her son-in-law, and he refusing to gratify her wishes, she accused him to her husband of a rape, on which he slew them both.

ACATALECTIC, a term, in the ancient poetry, for such verses as have all their feet or syllables, in contradistinction to those that have a syllable too few.

ACATALEPSY, signifies the impossibility of comprehending something.—The distinguishing tenet of the Pyrrhonists was their asserting an absolute acatalepsy in regard to every thing.

ACATERY, or ACCATRY, an officer of the king's household, designed for a check betwixt the clerks of the kitchen and the purveyors.

ACATHARSIA, an impurity of the blood or humours.

ACATHISTUS, the name of a solemn hymn anciently sung in the Greek church, on the Saturday of the fifth week of Lent, in honour of the Virgin, for having thrice delivered Constantinople from the invasions of the barbarous nations.

ACCA (St), bishop of Hagafultdt, or Hexham, in Northumberland, succeeded Wilfrid in that see in 709. He ornamented his cathedral in a most magnificent manner: he furnished it also with plate and holy vestments; and erected a noble library, confiding chiefly of ecclesiastical learning, and a large collection of the lives of the saints, which he was at great pains to procure.—He was accounted a very able divine, and was famous for his skill in church-music. He wrote several pieces: particularly, *Passiones Sanctorum*, the Sufferings of the Saints: *Pro illustrandis scripturis, ad Bedam*; For explaining the scriptures, addressed to Bede. He died in 740, having enjoyed the see of Hexham 31 years, under Egbert king of the Northumbrians.

ACCALIA, in Roman antiquity, solemn festivals held in honour of Acca Laurentia, Romulus's nurse: they were otherwise called *Laurentalia*.

ACCAPITARE, in law, the act of becoming vassal of a lord, or of yielding him homage and obedience. Hence,

ACCAPITUM, signifies the money paid by a vassal upon his admission to a feu.

ACCAPITUM, in our ancient law, was used also to express the relief due to the chief lord. See RELIEF.

ACCEDAS *ad curiam*, in the English law, a writ lying, where a man has received, or fears, false judgment in an inferior court. It lies also for justice delayed, and is a species of the writ *recordare*.

ACCESSIONES. See ACCEDONES.

ACCELERATED, implies, in a general sense, quickened, continually increasing. Thus, *accelerated motion* is a motion continually increasing. See MOTION.

ACCELERATION, an increase of velocity in the motion of a body; it is opposed to *retardation*, which is a diminution of motion.

ACCELERATION, is also a term used by ancient astronomers, with whom it signified the difference between

the revolution of the primum mobile and that of the sun, computed to be three minutes and fifty-six seconds.

ACCELERATOR, in anatomy, the name of two muscles of the penis, which serve for ejecting the urine or semen. See ANATOMY, n° 176.

ACCENDENTES, a lower order of ministers in the Romish church, whose office is to light and trim the candles.

ACCENDONES, or ACCEDONES, in Roman antiquity, a kind of gladiators, whose office was to excite and animate the combatants during the engagement. * See Gladi-
ator. The orthography of the word is contested: the first edition of Tertullian, by Rhenanus, has it *accedones*; an ancient manuscript, *accendones*. Aquinas adheres to the former, Pitiscus to the latter. The origin of the word, supposing it *accendones*, is from *accendo*, I kindle; supposing it *accedones*, from *accedo*, I accede, am added to. The former places their distinguishing character in enlivening the combat by their exhortations and suggestions; the latter supposes them to be much the same with what among us are called *seconds*, among the Italians *patroni*: excepting that these latter only stand by to see the laws of the sword duly observed, without intermeddling to give advice or instruction.

ACCENSI, in the Roman armies, certain supernumerary soldiers, designed to supply the places of those who should be killed or anywise disabled. They were thus denominated, *quia accensebantur*, or *ad censum adiciebantur*. Vegetius calls them *supernumerarii legionum*. Cato calls them *serentarii*, in regard they furnished those engaged in battle with weapons, drink, &c. Though Nonnius suggests another reason of that appellation, *viz.* because they fought with stones, slings, and weapons *que ferruntur*, such as are thrown, not carried in the hand. They were sometimes also called *velites*, and *velati*, because they fought clothed, but not in armour; sometimes *adscripticii*, and *adscriptivi*; sometimes *rorarii*. The *accensi*, Livy observes, were placed at the rear of the army, because no great matter was expected from them: they were taken out of the fifth class of citizens.

ACCENSI, in antiquity, denotes an inferior order of officers, appointed to attend the Roman magistrates, somewhat in the manner of ushers, sergeants, or tipstaves among us. They were thus called from *accire*, to tend for; one part of their office being to call assemblies of the people, summon parties to appear and answer before the judges, &c.

ACCENSI, was also an appellation given to a kind of adjutants, appointed by the tribune to assist each centurion and decurion. In which sense, *accensus* is synonymous with *optio*.—In an ancient inscription, given by a Torre, we meet ACCENSUS EQUITUM ROMANORUM; an office no where else heard of. That author suspects it for a corruption; and instead thereof reads, A CENSIBUS.

ACCENSION, the action of setting a body on fire: thus the accension of tinder is effected by striking fire with flint and steel.

ACCENT, in reading or speaking, an inflection of the voice, which gives to each syllable of a word its due pitch in respect of height or lowness. See the article READING, N° IV.—The word is originally Latin, *accentus*: a compound of *ad*, to; and *canto*, to sing. *Accentus*, quasi *adcantus*, or *juxta cantum*. In this sense,

Accent.

Accent.

senſe, accent is ſynonymous with the Greek *tonos*; the Latin *tenor*, or *tonor*; and the Hebrew *נוֹן*, *gufus*, taſte.—For the doctrine of *Accents* in *Compoſition*, ſee POETRY, Part II. n° 53, 62, 70, 90,—98.

ACCENT, among grammarians, is a certain mark or character placed over a ſyllable, to direct the ſtreſs of its pronunciation. We generally reckon three grammatical accents in ordinary uſe, all borrowed from the Greeks, *viz.* the *acute accent* (´), which ſhews when the tone of the voice is to be raiſed. The *grave accent* (`), when the note or tone of the voice is to be depreſſed. The *circumflex accent* (^ or ^), is compoſed of both the acute and the grave, and points out a kind of undulation of the voice. The Latins have made the ſame uſe of theſe three accents.

The Hebrews have a grammatical, a rhetorical, and muſical accent: though the firſt and laſt ſeem, in effect, to be the ſame; both being comprized under the general name of *tonic accents*, becauſe they give the proper tone to ſyllables; as the rhetorical accents are ſaid to be euphonic, inasmuch as they tend to make the pronunciation more ſweet and agreeable. There are four euphonic accents, and 25 tonic; of which ſome are placed above, and others below the ſyllables; the Hebrew accents ſerving not only to regulate the riſings and fallings of the voice, but alſo to diſtinguiſh the ſections, periods, and members of periods, in a diſcourſe; and to anſwer the ſame purpoſes with the points in other languages.—Their accents are divided into *emphatics*, *kings*, *dukes*, &c. each bearing a title anſwerable to the importance of the diſtinction it makes. Their emperor rules over a whole phraſe, and terminates the ſenſe completely; anſwering to our point. Their king anſwers to our colon; and their duke to our comma. The king, however, occasionally becomes a duke, and the duke a king, as the phraſes are more or leſs ſhort. It muſt be noted, by the way, that the management and combination of theſe accents diſſer in Hebrew poetry from what they are in proſe. The uſe of the tonic or grammatical accents has been much controverted: ſome holding that they diſtinguiſh the ſenſe; while others maintain that they are only intended to regulate the muſic, or ſinging; alledging that the Jews ſing, rather than read, the ſcriptures in their ſynagogues*. Be this, however, as it will, it is certain the ancient Hebrews were not acquainted with theſe accents. The opinion which prevails amongſt the learned, is, that they were invented about the ſixth century, by the Jewiſh doctōrs of the ſchool of Tiberias, called the *Maſſoretes*.

As to the Greek accents, now ſeen both in manuſcripts and printed books, there has been no leſs diſpute about their antiquity and uſe than about thoſe of the Hebrews. Iſaac Voſſius endeavours to prove them of modern invention; aſſerting, that anciently they had nothing of this kind, but only a few notes in their poetry, which were invented by Ariſtophanes the grammarian, about the time of Ptolemy Philopater; and that theſe were of muſical, rather than grammatical uſe, ſerving as aids in the ſinging of their poems, and very different from thoſe introduced afterwards. He alſo ſhews from ſeveral ancient grammarians, that the manner of writing the Greek accents in theſe days was quite different from that which appears in our books. The author of *La Methode Greque*, p. 546, obſerves, that the right

pronunciation of the Greek language being natural to the Greeks, it was needleſs for them to mark it by accents in their writings: ſo that, according to its appearance, they only began to make uſe of them ſo low as the time in which the Romans, being curious to learn the Greek tongue, ſent their children to ſtudy at Athens, thinking thereby to fix the pronunciation, and to facilitate it to ſtrangers; which happened, as the ſame author obſerves, a little before Cicero's time. Wetſtein, Greek profeſſor at Baſil, in a learned diſſertation endeavours to prove the Greek accents of an older ſtanding. He owns that they were not always formed in the ſame manner by the ancients; but thinks that difference owing to the different pronunciation which obtained in the different parts of Greece. He brings ſeveral reaſons, *a priori*, for the uſe of accents, even in the earlieſt days: as that they then wrote all in capital letters equidistant from each other, without any diſtinction either of words or phraſes, which without accents could ſcarce be intelligible; and that accents were neceſſary to diſtinguiſh ambiguous words, and to point out their proper meaning; which he confirms from a diſpute on a paſſage in Homer, mentioned by Ariſtotle in his *Poetics*, chap. v. Accordingly, he obſerves, that the Syrians, who have tonic, but no diſtinctive accents, have yet invented certain points, placed either below or above the words, to ſhew their mood, tenſe, perſon, or ſenſe.

The uſe of accents, to prevent ambiguities, is moſt remarkably perceived in ſome eaſtern languages, particularly the Siameſe and Chineſe. Among the people of China, every word, or (which is the ſame thing) ſyllable, admits of five accents, as ſpoken more acutely or remiſſly; and thus ſtands for many different things. The ſame ſound *ya*, according to the accent affixed to it, ſignifies *God*, a *wall*, *excellent*, *ſtupidity*, and a *gooſe*.—The Chineſe have but 330 ſpoken words in their language; but theſe being multiplied by the different accents or tones, which affect the vowels, furniſh a language tolerably copious. By means hereof, their 330 ſimple ſounds come to denote 1650 things; but this being hardly ſufficient, they are increaſed further by aſpirates added to each word, to double the number. The Chineſe only reckon four accents: for which the miſſionaries uſe the following marks, *ā, á, â, ã*; to which they have added a fifth, thus, *ä*. They make a kind of modulation; wherein, prolonging the duration of the ſound of the vowel, they vary the tone, raiſing and ſinking it by a certain pitch of voice: ſo that their talking is a ſort of muſic or ſinging. Attempts have been made to determine the quantity of the riſe or fall in each accent by means of muſical notes; but this is hard to effect, as being different in different perſons. Hence the great difficulty of the language to foreigners; they are forced to ſing moſt ſcrupuloſly: if they deviate ever ſo little from the accent, they ſay quite a different thing from what was intended. Thus, meaning to compliment the perſon you are talking to with the title *Sir*, you call him a beaſt, with the ſame word, only a little varied in the tone. Magalhon makes the language the eaſier to learn on this account.—The Siameſe are alſo obſerved to ſing rather than talk. Their alphabet begins with ſix characters, all only equivalent to a K, but differently accented. For tho' in the pronunciation the accents are naturally on the vowels, yet they have ſome to diverſify ſuch of their conſonants.

* Cooper;
Dom. Mo-
ſaic. Clav.
p. 31.

Accent conforants as are in other respects the same.

Acciaioli. ACCENT, in music, is a certain modulation of sounds to express a passion, whether by the voice or instruments.

* *See* Trio. ACCENTER, in music, one of the three fingers in a trio, viz. the person who sings the highest part *.

ACCEPTANCE, in law, a person's agreeing to offers made in bargaining, by which the bargain is concluded.

ACCEPTANCE, in the church of Rome, is put for receiving the pope's constitutions.

ACCEPTANCE, in commerce, is the subscribing, signing, and making one's self debtor for the sum contained in a bill of exchange or other obligation. See *BILLS*.

ACCEPTATION, in grammar, the sense or meaning wherein any word is taken.

ACCEPTER, or ACCEPTOR, the person who accepts a bill of exchange, &c.

ACCEPTILATION, among civilians, an acquittance or discharge given by the creditor to the debtor without the payment of any value.

ACCESSIBLE, something that may be approached, or that access may be had to. Thus we say, Such a place is accessible on one side, &c.

ACCESSION, in law, is a method of acquiring property, by which, in things that have a close connexion or dependence upon one another, the property of the principal thing draws after it the property of the accessory. Thus, the owner of a cow becomes likewise the owner of the calf. See *LAW*, Part III. n^o clxii. 6. It sometimes likewise signifies consent or acquiescence.

ACCESSION, among physicians, is used for a paroxysm of a disease; among politicians, it signifies a prince's succeeding to the government upon the death of his predecessor.

ACCESSORY, in law, is the subject acquired by accession: Or, in crimes, it signifies the person by whose assistance, advice, or command, the crime was committed; in which sense, it is the same with accomplice, aid and part, &c. See *LAW*, Part III. n^o clxxxiv. 4, 45, 50.

ACCI, a town of Tarraconensis, (Pliny, Ptolemy;) formerly called *Adi*, supposed to be Guadix, to the east of the city of Granada, at the foot of a mountain, near the source of the rivulet Guadalatin. Now greatly decayed. It is the Colonia Accitana Gemella, (coins); and was of some repute among the Roman colonies. The people were called Gemellenenses, because the colony consisted of colonists from the third and sixth legions.

ACCIAIOLI (Donato), a man famous for his learning and the honourable employments he possessed in Florence his native country, in the 15th century. He wrote, A Latin translation of some of Plutarch's Lives; Commentaries on Aristotle's Ethics and Politics; and the Life of Charlemagne. He was sent to France by the Florentines, to sue for succour from Lewis XI. against Pope Sixtus IV. but died on his journey at Milan; his body was carried to Florence, and buried in the church of the Carthusians. The small fortune he left his children is a proof of his probity and disinterestedness. His daughters, like those of Aristides, were married at the public expense, as an acknowledgment of his services. His funeral elegium was spoken by Christopher Landini; and an elegant epitaph, by Politian, was inscribed on his tomb.

ACCIDENT, in a general sense, denotes any casual event.

ACCIDENT, among logicians, is used in a threefold sense. 1. Whatever does not essentially belong to a thing; as the clothes a man wears, or the money in his pocket. 2. Such properties in any subject as are not essential to it; thus whiteness in paper is an accidental quality. 3. In opposition to substance, all qualities whatever are called accidents; as sweetness, softness, &c.

ACCIDENT, in grammar, implies a property attached to a word, without entering into its essential definition; for every word, notwithstanding its signification, will be either primitive, derivative, simple, or compound, which are the accidents of words. A word is said to be primitive, when it is taken from no other word in the language in which it is used: thus *heaven, king, god*, are primitive words. It is said to be derivative, when it is taken from some other word: thus *heavenly, kingly, godness*, &c. are derivatives. A simple word is easily distinguished from a compound: thus *just, justice*, are simple words; *unjust, injustice*, are compound: *res* is a simple word, as well as *publica*; but *respublica* is a compound. Besides these accidents, which are common to all sorts of words, each particular species has its accidents: thus the accidents of the noun substantive are the gender, declension, and number; and the adjective has another accident, namely, the comparison. See *GRAMMAR*, n^o 14, &c. and the article *LANGUAGE*.

ACCIDENT, in heraldry, an additional point or mark in a coat of arms, which may be either omitted or retained without altering the essence of the armour; such as, abatement, difference, and tincture.

ACCIDENTAL, in a general sense, implies something that happens by accident, or that is not essential to its subject.

ACCIDENTAL, in philosophy, is applied to that effect which flows from some cause intervening by accident, without being subject, or at least without any appearance of being subject, to general laws or regular returns. In this sense, *accident* is opposed to *constant* and *principal*. Thus the sun's place is, with respect to the earth, the constant and principal cause of the heat in summer, and the cold in winter; whereas winds, snows, and rains, are the accidental causes which often alter and modify the action of the principal cause.

ACCIDENTAL Point, in perspective, is that point in the horizontal line where the projections of two lines parallel to each other meet the perspective plane.

ACCIPENSER, in ichthyology, a genus of fishes belonging to the Amphibia Nantes of Linneus. The accipenser has a single linear nostril: the mouth is in the under part of the head, and contains no teeth; the cirri are below the snout, and before the mouth. There are three species of this genus, viz.

1. The huso has 4 cirri; the body is naked, i. e. has no prickles or protuberances. The skin of the huso is so tough and strong, that it is employed for ropes in carts and other wheel-carriages; and the ichthyocolla *, or singlass of the shops, famous as an agglutinant, and used also for the lining of wines, is made from its sound or scales. The ancients were acquainted with the fish that afforded this drug. Pliny mentions it under the name of ichthyocolla; and says, that

Accident
||
Accipenser.

The
Hinglais-
thyocolla
fig. 6.

* See Ichthyocolla.

† Lib. xxxii. c. 7.

Plate I.

Fig. 1. *Alacrus*



Fig. 2. *Alacrus* or Counting Board



Fig. 3. *Alacrus*



Fig. 4. *Acipenser sturio* or Sturgeon



Fig. 5. *Acipenser huso* or Sturgeon Fish



Fig. 6. *Alacrus*





Acipenser. the glue that was produced from it had the same title; and afterwards adds, that it was made out of the belly of the fish. The hufe is the largest of the genus, and grows to 24 feet in length. It inhabits the Danube and the rivers of Russia.

2. The sturio, or sturgeon, with 4 cirri and 11 squamous protuberances on the back. That this is the *ovaceus* of Dorian, as quoted by Athenæus, is very probable, as from the account he gives of its form as of its nature. He says its mouth is always open, with which it agrees with the sturgeon; and that it conceals itself in the hot months: this shews it to be a fish of a cold nature; which is confirmed by the history of the European fish of this species given by

Mr Forster †, in his Essay on the *Volga*; who relates, that they are scarce ever found in that river in spring or summer, but in vast quantities in autumn and winter, when they crowd from the sea under the ice, and are then taken in great numbers. Whether the *acipenser* is the sturgeon of the moderns, may be doubted; otherwise Ovid never had spoken of it as a fore-
reign fish:

Tuque peregrinis, Acipenser, nobilis undis.

And thou, a fish in foreign seas renown'd—

it being well known that it is not uncommon in the Mediterranean, and even in the mouth of the Tiber, at certain seasons. But this passage leaves us as much in the dark as to the particular species intended by the word *acipenser*, as the description Pliny has given us: for that philosopher relates, that its scales are placed in a contrary direction to those of other fish, being turned towards the mouth; which disagrees with the character of all that are known at present. Whatever fish it might be, it was certainly the same with the *elops*, or *helops*; as appears from Pliny, who makes it synonym-

† Lib. ix. 17. mous with the *acipenser* †; and from another line of the poet beforementioned:

Et pretiosus Helops, nostris incognitus undis.

The precious Helops, stranger to our seas.

The sturgeon annually ascends our rivers, but in no great numbers, and is taken by accident in the salmon-nets. It seems a spiritless fish, making no manner of resistance when entangled, but is drawn out of the water like a lifeless lump. It is a fish that is seldom taken far out at sea, but frequents such parts as are not remote from the estuaries of great rivers. It is admired for the delicacy and firmness of its flesh, which is white as veal, and extremely good when roasted. It is generally pickled. The most we receive comes either from the Baltic rivers, or North America: those cured at Pillau have been, till of late, in the greatest repute; but through the encouragement given by the society instituted for promoting trade and manufactures, the sturgeon from our colonies begins to rival those of the Baltic. Great numbers are taken during summer in the lakes Frischehoff, and Curisch-haff near Pillau, in large nets made of small cord. The adjacent shores are formed into districts, and farmed out to companies of fishermen, some of which are rented for six thousand guilders, or near three hundred pounds, *per annum*. They are found in vast abundance in the American rivers in May, June, and July; at which time they leap some yards out of the water, and, falling on their sides, make a noise to be heard in still weather at some miles distance. Caviare is made of the roes of this, and also

VOL. I.

of all the other-forts of sturgeons, dried, salted, and packed up close. Ichthyocolla, or ising-glass, is also made of the sound of our fish, as well as that of the others; but in very small quantity. The sturgeon grows to a great size, to the length of 18 feet, and to the weight of 500 pounds, but it is seldom taken in our rivers of that bulk. The largest we have known caught in those of Great Britain, weighed 460 pounds; which was taken about three years ago in the Esk, where they are more frequently found than in our southern waters. In the manner of breeding, this fish is an exception among the cartilaginous kind; being, like the bony fish, oviparous, spawning in water.

3. The ruthenus has 4 cirri, and 15 squamous protuberances. It is a native of Russia.

ACCIPITER, the name of Linnæus's first order of Birds. See ZOOLOGY, n° 8, a.

Among the Romans, the term *accipiter* signified a hawk; and which, from its being very carnivorous, they considered as a bird of bad omen:

Odinus accipitrem, quia semper vivit in armis. OVID.

Pliny, however, tells us, that in some cases, particularly in marriage, it was esteemed a bird of good omen, because it never eats the hearts of other birds; intimating thereby, that no differences in a married state ought to reach the heart. The accipiter was worshipped as a divinity by the inhabitants of Tentyra, an island in the Nile, being considered by them as the image of the sun; and hence we find that luminary represented, in hieroglyphics, under the figure of a hawk.

ACCISMUS, denotes a feigned refusal of something which a person earnestly desires. The word is Latin; or rather Greek, *ακισμος*; supposed to be formed from *Acce*, the name of a foolish old woman noted in antiquity for an affectation of this kind.

Accismus is sometimes considered as a virtue; sometimes as a vice, which Augustus and Tiberius practised with great success. Cromwell's refusal of the crown of England, may be brought as an instance of an *Accismus*.

Accismus is more particularly used, in rhetoric, as a species of irony.

ACCIIUS (Lucius), a Latin tragic poet, the son of a freedman, and, according to St Jerom, born in the consulship of Hostilius Mancinus and Attilius Serranus, in the year of Rome 583; but there appears somewhat of confusion and perplexity in this chronology. He made himself known before the death of Pacuvius, a dramatic piece of his being exhibited the same year that Pacuvius brought one upon the stage, the latter being then eighty years of age, and Accius only thirty. We do not know the name of this piece of Accius's, but the titles of several of his tragedies are mentioned by various authors. He wrote on the most celebrated stories which had been represented on the Athenian stage; as Andromache, Andromeda, Atreus, Clytemnestra, Medea, Meleager, Philoctetes, the civil wars of Thebes, Tereus, the Troades, &c. He did not always, however, take his subjects from the Grecian story; for he composed one dramatic piece wholly Roman: it was entitled *Brutus*, and related to the expulsion of the Tarquins. It is affirmed by some, that he wrote also comedies; which is not unlikely, if he was the author of two pieces, the *Wedding*, and the *Merchant*, which have been ascribed to him. He

F

Accipiter
||
Accius.

Acclama-
tion.

did not confine himself to dramatic writing; for he left other productions, particularly his annals, mentioned by Macrobius, Priscian, Festus, and Nonius Marcellus. He has been censured for writing in too harsh a style, but in all other respects has been esteemed a very great poet. He was so much esteemed by the public, that a comedian was punished for only mentioning his name on the stage. Cicero speaks with great derision of one Accius who had written a history; and, as our author had wrote annals, some insist that he is the person censured: but as Cicero himself, Horace, Quintilian, Ovid, and Paterculus, have spoken of our author with so much applause, we cannot think it is him whom the Roman orator censures with so much severity.

There was also in this age a pretty good orator of the same name, against whom Cicero defended Cluentius. He was born in Pisaurum, and perhaps was a relation of our poet.

ACCIUS, a poet of the 16th century, to whom is attributed *A Paraphrase on Esop's Fables*, on which Julius Scaliger bestows great encomiums.

ACCLAMATION, a confused noise or shout of joy, by which the public express their applause, esteem, or approbation.

ACCLAMATION, in a more proper sense, denotes a certain form of words, uttered with extraordinary vehemence, and in a peculiar tone somewhat resembling a song, frequent in the ancient assemblies. Acclamations were usually accompanied by applauses, with which they are sometimes confounded: though they ought to be distinguished; as acclamation was given by the voice, applause by the hands; add, that acclamation was also bestowed on persons absent, applause only on those present. Acclamation was also given by women, whereas applause seems to have been confined to men.

Acclamations are of various kinds; ecclesiastical, military, nuptial, senatorial, synodical, scholastic, theatrical, &c. We meet with loud acclamations, musical and rhythmical acclamations; acclamations of joy and respect, and even of reproach and contumely. The former, wherein words of happy omen were used, were also called, *Laudationes, et bona vota*, or good wishes; the latter, *Exerationes et concilia*. Suetonius furnishes an instance of this last kind in the Roman senate, on occasion of the decree for demolishing the statues of Domitian, when the fathers, as the historian represents it, could not refrain from contumelious acclamations of the deceased. The like were shown after the death of Commodus, where the acclamations run in the following strain: *Hosti patria honores detrahantur, parricida honores detrahantur; hostis status undique, parricida status undique, gladiatoris status undique, &c.*—The formula, in acclamations, was repeated sometimes a greater, sometimes a lesser, number of times. Hence we find in Roman writers, *acclamatum est quinquies, et vicies*; five times, and twenty times: sometimes also *sexagesies*, and even *octuagesies*; sixty and eighty times.

Acclamations were not unknown on the theatres in the earliest ages of the Roman commonwealth; but they were artless then, and little other than confused shouts. Afterwards they became a sort of regular concerts. That mentioned by Phædrus, *letare incolunis Roma salvo principe*, which was made for Augustus, and proved the occasion of a plebeian mistake of a flute-

player called *Princeps*, shews that musical acclamations were in use in that emperor's reign. *Revertentem ex Provincia modulatis carminibus profæquebantur*, says Suetonius, who gives another instance in the time of Tiberius: a false report of Germanicus's recovery being spread through Rome, the people ran in crowds to the capitol with torches and victims, singing, *Salva Roma, Salva Patria, Salvus est Germanicus*.—Nero, passionately fond of music, took special care to improve and perfect the music of acclamations. Charmed with the harmony wherewith the Alexandrians, who came to the games celebrated at Naples, had sung his praises, he brought several over to instruct a number of youth, chosen from among the knights and people, in the different kinds of acclamations practised at Alexandria. These continued in use as low as the reign of Theodoric. But the people did not always make a single chorus; sometimes there were two, who answered each other alternately: thus, when Nero played on the theatre, Burrhus and Seneca, who were on either hand, giving the signal by clapping, 5000 soldiers called *Augustals*, began to chant his praise, which the spectators were obliged to repeat. The whole was conducted by a music-master called *Mesectorus* or *Pausanius*.—The honour of acclamations was chiefly rendered to emperors, their children, and favourites; and to the magistrates who presided at the games. Persons of distinguished merit also sometimes received them, of which Quintilian gives us instances in Cato and Virgil. The most usual forms were, *Feliciter, Longiorem vitam, Annos felices*. The actors themselves, and they who gained the prizes in the games of the circus, were not excluded the honour of acclamations.

To theatrical acclamations may be added those of the soldiery and the people in time of triumph. The victorious army accompanied their general to the capitol; and, among the verses they sung in his praises, frequently repeated, *IO TRIUMPHÉ*, which the people answered in the same strain. It was also in the way of acclamation, that the soldiers gave their general the title of *Imperator*, after some notable victory: a title which he only kept till the time of his triumph.

The acclamations of the senate were somewhat more serious than the popular ones; but arose from the same principle, *viz.* a desire of pleasing the prince or his favourites; and aimed likewise at the same end, either to express the general approbation and zeal of the company, or to congratulate him on his victories, or to make him new protestations of fidelity. These acclamations were usually given after a report made by some senator, to which the rest all expressed their consent by crying *OMNES, OMNES*; or else, *ÆQUUM EST, JUSTUM EST*. Sometimes they began with acclamations, and sometimes ended with them without other debates. It was after this manner that all the elections and proclamations of emperors, made by the senate, were conducted; something of which practice is still retained at modern elections of kings and emperors, where *Vivat Rex, Vive le Roy*, and *Long live the King*, are customary forms.

The Greeks borrowed the custom of receiving their emperors in the public places from the Romans. Luitprand relates, that at a procession where he was present, they sung to the emperor Nicephorus, *ΘΕΑΛΛΕΙΤΕ*; that is, Many years: which Codin expresses thus, by

Acclama-
tion.

Acclamation.

το ἄκλιτον το πολυχρονον, or by το πολυχρονον; and the wish or salutation by πολυχρονον. And at dinner, the Greeks then present wished with a loud voice to the emperor and Bardas, *Ut Deus annos multiplices*; as he translates the Greek. Plutarch mentions an acclamation so loud, upon occasion of Flaminius's restoring liberty to Greece, that the very birds fell from heaven with the shout. The Turks practise something like this on the fight of their emperors and grand viziers, to this day.

For the acclamations wherewith authors, poets, &c. were received, who recited their works in public; it is to be observed, the assemblies for this purpose were held with great parade in the most solemn places, as the capitol, temples, the Atheneum, and the houses of great men. Invitations were sent every where, in order to get the greater appearance. The chief care was that the acclamations might be given with all the order and pomp possible. Men of fortune who pretended to wit, kept able applauders in their service, and lent them to their friends. Others endeavoured to gain them by presents and treats. Philostratus mentions a young man named Vavus, who lent money to the men of letters, and forgave the interest to such as applauded his exercises. These acclamations were conducted much after the same manner as those on the theatre, both as to the music and the accompaniments: they were to be suited both to the subject and to the person. There were particular ones for the philosophers, for orators, for historians, and for poets. It would be difficult to rehearse all the forms of them; one of the most usual was *Sophos*, which was to be repeated three times. Martial comprehends several other usual forms in this verse:

Grauior, Cito, Nequiter, Euge, Beate.

Neither the Greeks nor Romans were barren on this head. The names of gods and heroes were given those whom they would extol. It was not enough to do it after each head of discourse, chiefly after the exordium; but the acclamations were renewed at every fine passage, frequently at every period.

The acclamations wherewith the spectators honoured the victories of the athletes, were a natural consequence of the impetuous motions which attended the gymnastic games. The cries and acclamations of the people, sometimes expressing their compassion and joy, sometimes their horror and disgust, are strongly painted by different poets and orators.

Acclamations made also a part of the ceremony of marriage. They were used for the omen's sake; being the *Leta Omina*, sometimes spoken of before marriage in Roman writers.

Acclamations, at first practised in the theatre, and passing thence to the senate, &c. was in process of time received into the acts of councils, and the ordinary assemblies of the church. The people expressed their approbation of the preacher variously; the more usual forms were, *Orthodox!* *Third Apostle*, &c. These acclamations being sometimes carried to excess, and often misplaced, were frequently prohibited by the ancient doctors, and at length abrogated; though they appear to have been in some use as low as the time of St Bernard.

ACCLAMATION Medals, among antiquaries, such as represent the people expressing their joy in the posture of acclamation.

ACCLIVITY, the rise or ascent of a hill, in opposition to the declivity or descent of it. Some writers in fortification use it for the talus of a rampart.

ACCOLA, among the Romans, signified a person who lived near some place; in which sense, it differed from *incola*, the inhabitant of such a place.

ACCOLADE, a ceremony anciently used in the conferring of knighthood.

Antiquaries are not agreed wherein the accolade properly consisted. The generality suppose it to be the embrace, or kiss, which princes anciently gave the new knight, as a token of their affection: whence the word *accolade*; *q. d.* a clapping, or taking round the neck. Others will rather have it to be a blow on the chine of the neck, given on the same occasion. The Accolade is of some antiquity, in whichsoever of the two senses it be taken. Greg. de Tours writes, that the kings of France, even of the first race, in conferring the gilt shoulder-belt, kissed the knights on the left cheek. For the *accolé*, or blow, John of Salisbury assures us, it was in use among the ancient Normans: by this it was that William the Conqueror conferred the honour of knighthood on his son Henry. At first, it was given with the naked fist; but was afterwards changed into a blow with the flat of the sword on the shoulder of the knight.

ACCOLEE, sometimes synonymous with ACCOLADE, which see.—It is also used in various senses in heraldry: sometimes it is applied to two things joined; at other times, to animals with crowns, or collars about their necks, as the lion in the Ogilvy's arms; and, lastly, to kews, battons, maces, swords, &c. placed saltierwise behind the field.

ACCOLTI (Bernardo), secretary to the republic of Florence, was surnamed L'Unico, or the Non-Such, probably from the great extent of his understanding, the variety of sciences he had acquired, and the excellency of his poetic vein; which not only gained him a seat among the academicians of the court of Urbino, but made that great Mæcenas, pope Leo X. in 1520, create him prince of the state of Nepi. He wrote many pieces; among others, a collection of beautiful poems, printed at Venice in 1519 and 1553.

ACCOMMODATION, the application of one thing, by analogy, to another; or the making two or more things agree with one another.

To know a thing by accommodation, is to know it by the idea of a similar thing referred thereto.

A prophecy of scripture is said to be fulfilled various ways; properly, as when a thing foretold comes to pass; and improperly, or by way of accommodation, when an event happens to any place or people, like to what fell out some time before to another.—Thus, the words of Isaiah, spoken to those of his own time, are said to be fulfilled in those who lived in our Saviour's; and are accommodated to them: "Ye hypocrites, well did Isaiah prophecy of you," &c. which same words, St Paul afterwards accommodates to the Jews of his time.

The primitive church accommodated multitudes of Jewish, and even heathen ceremonies and practices, to Christian purposes; but the Jews had before done the same by the Gentiles: some will even have circumcision, the tabernacle, brazen serpent, &c. to have been originally of Egyptian use, and only accommodated by

Acclivity
||
Accommodation.

Accompaniment
—
Accomplishment.

* Saurin,
Diff. O. T.
tom. i.
p. 506.

† De legib.
liber. diff. i.
l. 3. p. 32.

Moses to the purposes of Judaism*. Spencer maintains, that most of the rites of the old law, were an imitation of those of the Gentiles, and particularly of the Egyptians; that God, in order to divert the children of Israel from the worship they paid to the false deities, consecrated the greatest part of the ceremonies performed by those idolaters, and had formed out of them a body of the ceremonial law; that he had indeed made some alterations therein, as barriers against idolatry; and that he thus accommodated his worship to the genius and occasions of his ancient people. To this concession of God, according to Spencer †, is owing the origin of the tabernacle, and particularly that of the ark.

ACCOMPANIMENT, something attending or added as a circumstance to another, either by way of ornament, or for the sake of symmetry.

ACCOMPANIMENT, in music, denotes the instruments which accompany a voice to sustain it, as well as to make the music more full. The accompaniment is used in recitative, as well as in song; on the flute, as well as in the choir, &c. The ancients had likewise their accompaniments on the theatre; they had even different kinds of instruments to accompany the chorus, from those which accompanied the actors in the recitation.—The accompaniment, among the moderns, is frequently a different part or melody from the song it accompanies. It is disputed whether it was so among the ancients. It is generally alleged, that their accompaniments went no farther than the playing in octave, or in antiphony to the voice. The Abbe Frauguier, from a passage in Plato, pretends to prove, that they had actual symphony, or music in parts: but his arguments seem far from being conclusive.

ACCOMPANIMENT, in painting, denotes such objects as are added, either by way of ornament, or probability; as dogs, guns, game, &c. in a hunting-piece.

ACCOMPANIMENT, in heraldry, any thing added to a shield by way of ornament; as the belt, mantling, supporters, &c. It is also applied to several bearings about a principal one; as a saltire, bend, fess, chevron, &c.

ACCOMPLICE. See ACCESSARY.

ACCOMPLISHMENT, the entire execution or fulfilling of any thing.

ACCOMPLISHMENT, is principally used in speaking of events foretold by the Jewish prophets in the Old Testament, and fulfilled under the New. We say a literal accomplishment, a mythical or spiritual accomplishment, a single accomplishment, a double accomplishment, a Jewish accomplishment, a Christian, a heathen accomplishment. The same prophecy is sometimes accomplished in all, or several of those different ways. Thus, of some of the prophecies of the Old Testament, the Jews find a literal accomplishment in their own history, about the time when the prophecy was given: the Christians find another in Christ, or the earliest days of the church; the heathens another, in some of their emperors; the Mahometans, another in their legislator; &c. There are two principal ways of accomplishing a prophecy; directly, and by accommodation. See ACCOMMODATION, and PROPHECY.

ACCOMPLISHMENT, is also used for any mental or personal endowment.

ACCORD, in music. See CONCORD.

ACCORD, in painting, is the harmony that reigns among the lights and shades of a picture.

ACCOUNT, or ACCOUNTY, in a general sense, a computation or reckoning of any thing by numbers.—Collectively, it is used to express the books which merchants, traders, bankers, &c. use for recording their transactions in business. See BOOK-KEEPING.

Chamber of ACCOUNTS, in the French polity, is a sovereign court of great antiquity, which takes cognizance of and regulates the accounts of the king's revenue. It is nearly the same with the English Court of Exchequer.

ACCOUNT is taken sometimes, in a particular sense, for the computation of time: thus we say, The Julian Account, the Gregorian Account, &c. in which sense it is equivalent to style.

ACCOUNTANT, or ACCOUNTANTY, in the most general sense, is a person skilled in accounts. In a more restricted sense, it is applied to a person, or officer, appointed to keep the accounts of a public company or office; as the South-sea, the India-company, the Bank, the Excise, &c.

ACCOUNTANTSHIP, the art of keeping and balancing accounts. See BOOK-KEEPING.

ACCOUNTANT-GENERAL, a new officer in the court of Chancery appointed by act of parliament to receive all moneys lodged in court instead of the masters, and convey the same to the bank of England for security.

ACCOUNTING-HOUSE, COUNTING-HOUSE, or COMPTING-HOUSE, is a house, or office, set apart by a merchant, or trading-company, for transacting their business, as well as keeping their books, accounts, vouchers, &c.

ACCOUTREMENT, an old term, applied to the furniture of a soldier, knight, or gentleman.

ACCRETION, in physics, the increase, or growth, of an organical body, by the accession of new parts*.

ACCRETION, among civilians, the property acquired in a vague or unoccupied thing, by its adhering to or following another already occupied: thus, if a legacy be left to two persons, one of whom dies before the testator, the legacy devolves to the survivor by right of accretion.

ACCROCHE, in heraldry, denotes a thing's being hooked with another.

ACCUBATION, a posture of the body, between sitting and lying. The word comes from the Latin *accubare*, compounded of *ad*, to, and *cubo*, I lie down. *Accubation*, or *Accubitur*, was the table-posture of the Greeks and Romans; whence we find the words particularly used for the lying, or rather (as we call it) sitting, down to meat. The Greeks introduced this posture. The Romans, during the frugal ages of the republic, were strangers to it. But as luxury got footing, this posture came to be adopted, at least by the men; for as to women, it was reputed an indecency in them to lie down among the men: though, afterwards, this too was got over. But children did not lie down; nor servants, nor soldiers, nor persons of meaner conditions; but took their meals sitting, as a posture less indulgent. The Roman manner of disposing themselves at table was this: A low round table was placed in the *cœnaculum*, or dining-room; and, about this, usually three, sometimes only two, beds or couches; according to the number

Account
—
Accubation.

* See Nutrition, Plants, and Vegetation.

Accubitor
Accusation.

ber of which, it was called *biclinium* or *triclinium*. These were covered with a sort of bed-clothes, richer or plainer according to the quality of the person, and furnished with quilts and pillows, that the guests might lie the more commodiously. There were usually three persons on each bed; to crowd more, was esteemed fordid. In eating, they lay down on their left sides, with their heads resting on the pillows, or rather on their elbows. The first lay at the head of the bed, with his feet extended behind the back of the second; the second lay with the back of his head towards the navel of the first, only separated by a pillow, his feet behind the back of the third; and so of the third, or fourth. The middle place was esteemed the most honourable. Before they came to table, they changed their clothes, putting on what they called *canatoria vestis*, the dining-garment; and pulled off their shoes, to prevent fouling the couch.

ACCUBITOR, an ancient officer of the emperors of Constantine, whose business was to lie near the emperor. He was the head of the youths of the bed-chamber, and had the *cubicularius* and *procurator* under him.

ACCUMULATION, in a general sense, the act of heaping or amassing things together. Among lawyers, it is used in speaking of the concurrence of several titles to the same thing, or of several circumstances to the same proof.

ACCUMULATION of Degrees, in an university, is the taking several of them together, or at smaller intervals than usual, or than is allowed by the rules of the university.

ACCURSED, denotes something that lies under a curse, or is detestable. It is likewise used for an excommunicated person.

ACCURSIUS, a law-professor in the 13th century, born in Florence. His authority was for some time so great, that he was called the Idol of the Lawyers.

ACCUSASUS (Mariangelus), a famous critic of the 16th century, born at Aquilo in the kingdom of Naples. His Diatribes, printed at Rome in folio, in 1524, on Ovid and Solinus, are a proof of his abilities in that kind of erudition. In his edition of Ammianus Marcellinus there are five books more than in any of the preceding ones; and he affirms he had corrected 5000 errors in that historian. His predominant passion was the searching for and collecting of old manuscripts: yet he made Latin and Italian verses; was complete master of the French, German, and Spanish tongues; and understood optics and music. He purged himself by oath, being charged for being a plagiarist with regard to his Aufonius; it being reported, that he had appropriated to himself the labours of Fabricio Varana, bishop of Camerino.

ACCUSATION, the charging any person with a criminal action, either in one's own name, or in that of the public. The word is composed of *ad*, to; and *causari*, to plead.

Writers on politics treat of the benefit and the inconveniences of public accusations. Various arguments are alleged, both for the encouragement and discouragement of accusations against great men. Nothing, according to Machiavel, tends more to the preservation of a state, than frequent accusations of persons trusted with the administration of public affairs.

This, accordingly, was strictly observed by the Romans, in the instances of Camillus, accused of corruption by Manlius Capitolinus, &c. Accusations, however, in the judgment of the same author, are not more beneficial than calumnies are pernicious; which is also confirmed by the practice of the Romans. Manlius not being able to make good his charge against Camillus, was cast into prison.

By the Roman law, there was no public accuser for public crimes; every private person, whether interested in the crime or not, might accuse, and prosecute the accused to punishment, or abolition. Cato, the most innocent person of his age, had been accused 42 times, and as often absolved. But the accusation of private crimes was never received but from the mouths of those who were immediately interested in them: None (*s. g.*) but the husband could accuse his wife of adultery.

The ancient Roman lawyers distinguished between *postulatio*, *delatio*, and *accusatio*. For, first, leave was desired to bring a charge against one, which was called *postulare*: then he against whom the charge was laid, was brought before the judge; which was called *deferre*, or *nomini delatio*: lastly, the charge was drawn up and presented, which was properly the *accusatio*. The accusation properly commenced, according to Pædianus, when the *reus* or party charged, being interrogated, denied he was guilty of the crime, and subscribed his name to the *delatio* made by his opponent.

In the French law, none but the Procureur general, or his deputies, can form an accusation, except for high-treason and coining, where accusation is open to every body. In other crimes, private persons can only act the part of denouncers, and demand reparation for the offence, with damages.

In Britain, by Magna Charta, no man shall be imprisoned or condemned on any accusation, without trial by his peers, or the law: none shall be vexed with any accusation, but according to the law of the land: and no man may be molested by petition to the king, &c. unless it be by indictment or presentment of lawful men, or by process at common law. Promoters of suggestions, are to find surety to pursue them; and if they do not make them good, shall pay damages to the party accused, and also a fine to the king. No person is obliged to answer upon oath to a question whereby he may accuse himself of any crime.

ACCUSATIVE, in the Latin grammar, is the fourth case of nouns *, and signifies the relation of the noun on which the action implied in the verb terminates; and hence, in such languages as have cases, these nouns have a particular termination, called *accusative*: as, *Augustus vicit Antonium*, Augustus vanquished Antony. Here *Antonium* is the noun, on which the action implied in the verb *vicit* terminates; and, therefore, must have the accusative termination. Ovid, speaking of the palace of the sun, says, *Materiem superabat opus*, The work surpassed the materials. Here *Materiem* has the accusative termination; because it determines the action of the verb *superabat*.—In the English language there are no cases, except the genitive; the relation of the noun being shewn by the assistance of prepositions, as *of*, *to*, *from*, &c.

ACCUSIURUM COLONIA, (Ptolemy;) an inland town in the Cavares, in Gallia Narbonensis: now Grenoble, in Dauphiné. See GRENoble.

Accusation?
Accusative.

* See *Gram-
mar*, p. 11.
and *Latin
grammar*, p. 23.
&c.

Are
Accephalus.

ACE, among gamesters, a card or die marked only with one point.

ACEPHALI, or ACEPHALITÆ, a term applied to several sects who refused to follow some noted leader. Thus the persons who refused to follow either John of Antioch, or St Cyril, in a dispute that happened in the council of Ephesus, were termed *Accephali*, without a head or leader. Such bishops, also, as were exempt from the jurisdiction and discipline of their patriarch, were styled *Accephali*.

ACEPHALI, the levellers in the reign of king Henry I. who acknowledged no head or superior. They were reckoned so poor, that they had not a tenement by which they might acknowledge a superior lord.

ACEPHALOUS, or ACEPHALUS, in a general sense; without a head.

The term is more particularly used in speaking of certain nations, or people, represented by ancient naturalists and cosmographers, as well as by some modern travellers, as formed without heads; their eyes, mouths, &c. being placed in other parts.

Such are the *Blemmyes*, a nation of Africa near the head of the Niger, represented to be by Pliny and Solinus; *Blemmyes traduntur capita abesse, ore & oculis pectore affixis.* Ctesias and Solinus mention others in India near the Ganges, *sine cervice, oculus in humeris habentes.* Mela also speaks of people, *quibus capita et cultus in pectore sunt.* And Suidas, Stephanus Byzantinus, Vopiscus, and others after them, relate the like. Some modern travellers still pretend to find accephalous people in America.

Several opinions have been framed as to the origin of the fable of the Accephali. The first is that of Thomas Bartholin, who turns the whole into a metaphor; being convinced, that the name Accephali was anciently given to such as had less brain, or conducted themselves less by the rules of prudence, than others. Olearius rather apprehends, that the ancient voyagers, viewing certain barbarous people from the coasts, had been imposed on by their uncouth dress; for that the Samogitians, being short of stature, and going in the severity of winter with their heads covered in hoods, seem at a distance as if they were headless. F. Lastau says, that by Accephali are only meant, people whose heads are sunk below their shoulders. In effect, Hullius, in his epitome of Sir Walter Raleigh's voyage to Guiana, also speaks of a people which that traveller found in the province of Iripipana, between the lakes of Panama and Cassipa, who had no head or neck; and Hondius, in his map, marks the place with the figures of these monsters. Yet De Laet rejects the story; being informed by other hands, that the inhabitants of the banks of the Caora, a river that flows out of the lake of Cassipa, have their head so far sunk between their shoulders, that many believed they had their eyes in their shoulders and their mouths in their breasts.

† Descriet.
Amer. l. 17
c. 12.

|| In Eph. Ger. dec. i. an. 3. obf. 219. p. 164. Dec. 2. an 9. obf. 148. Wolfius, Mauriceau, &c.

* See Tania. ACEPHALUS, an obsolete term for the *tænia* * or tape-worm, which was long supposed to be accephalous. The first who gave it a head, was Tulpus; and after him,

Fehr: The former even makes it *biceps*, or two-headed.

ACEPHALUS, is also used to express a verse defective in the beginning.

ACER, the maple-tree; a genus of plants, of the monœcia order, belonging to the polygama class. Of this genus there are ten

Species. 1. The pseudo *platanus*, improperly called the *scamora*, is a very large and beautiful tree, with broad leaves divided into five lobes, serrated in their edges; of a dark-green colour on the upper side, but paler and somewhat hoary underneath; the flowers are very small, and of a greenish white colour. The fruit is large, and beautifully variegated with green and purple. This species is a native of Germany; but thrives very well in Britain, where it is frequent in plantations. It is very proper for making plantations near the sea, or sheltering such as are already too near it, because the *scamora*-tree resists the spray of the ocean much better than most other trees. It has however this inconvenience, that its leaves are devoured by insects, so as to become full of holes and very unsightly, which has caused the planting of it to be much neglected of late. 2. The *campestre*, or common maple, is too well known to need any particular account; it growing very frequently, in hedge-rows, in most parts of Britain. The timber of the common maple is far superior to beech for all uses of the turner; particularly for dishes, cups, trenchers, &c. When it abounds with knots, as it frequently does, it is highly esteemed by joiners for inlayings. It is also often employed in making musical instruments, on account of its lightness; and for the whiteness of its wood was formerly esteemed for making tables, &c. 3. The *negundo*, or Virginian ash-leaved maple, is a very strong shooting tree; and in Virginia, where it is a native, is one of the largest trees of this kind. It must be planted in places not too much exposed to violent winds, being subject to split thereby. 4. The *platanoides*, or Norway maple, grows naturally in Norway, Sweden, and other Northern countries in Europe: it rises to a good height; and is well furnished with branches, with smooth leaves, of a shining green colour, divided in the form of an hand. These have an acrid milky juice, which prevents them from being preyed upon by insects as the *scamora* is; and as this species resists the spray of the sea equally with the first, it is preferred in plantations situated near the sea. 5. The *rubrum*, or Virginian scarlet flowering maple, is a native of that country, and never grows to a large size in Britain. It is, however, cultivated in gardens for the beauty of its flowers, which appear in the beginning of April, in roundish bunches, at the bottom of the footstalks of the leaves. The seeds are ripe in five or six weeks after; and ought to be immediately sown, being otherwise very apt to perish. The tree ought to be sheltered, especially whilst young, from the north-east winds; it delights in a moist light soil, where it will thrive much better, as well as produce many more flowers and much better seeds, than in a dry ground. A variety of this tree is known in England by the name of *Sir Charles Wager's Flowering Maple*, from its being first sent from America to Sir Charles Wager. The flowers of this kind come out in larger clusters than the other, and surround the small branches, so that the tree appears entirely covered with them, and makes a much more beautiful appearance than the former,

Acer,
the
Maple-tree.

Acerra,
the
Maple tree.
• See Sugar.

mer, which now is not so much esteemed. 6. The fackharinum, or American sugar-maple, so called from a coarse kind of sugar being obtained from its juice by the inhabitants of North America *, grows to a large size. When young, it very much resembles the Norway maple; but as it grows up, the leaves become more deeply divided, and their surfaces less smooth; they are, besides, preyed upon by insects, like the sycamore; by which circumstances the two species are easily distinguished. 7. The Penylvanicum, or American mountain-maple, very much resembles the sugar-maple, only its leaves are more pointed. 8. The opalus, or Italian maple, is very common in most parts of Italy, particularly about Rome; but in Britain is very rarely to be met with, though hardly enough to bear the open air. It is one of the largest species of trees in Italy, and affords a great shade by its numerous and large leaves. On this account it is planted on the road-sides, and near habitations. 9. The montepulianum, or Montpellier maple, is common in the south of France, and in Italy; but is hardly met with in Britain. The leaves resemble those of the common maple; but are of a much thicker substance, a shining green colour, and not so large. They continue in verdure very late in the autumn, which renders the trees more valuable. 10. The creticum, or Cretan maple, grows naturally in the Levant; it somewhat resembles the last species; but its leaves are of a much thinner texture, and their footstalks covered with a soft hairy down; whereas those of the other are smooth and soft.

Culture. All these species are propagated either by seeds or cuttings. If the first method is chosen, the seeds should be sown in autumn, soon after they are ripe, in a bed of common earth, covering them about half an inch thick with light mould. If they cannot be sown in autumn, they must be put into sand to preserve their growing quality; for if kept dry till the spring, the seeds often fail, or at least lie a whole year in the ground before they vegetate. The seeds ought also to be sown in a sheltered situation; because most sorts of maple, especially those which come from America, are very impatient of heat while young; and if the young plants are exposed to the sun but one day, few of them will survive; being instantly attacked by insects, which in that short time devour their seed-leaves, after which the plants drop to the ground. This is most especially remarkable in the American sugar-maple. When the plants come up, they must be kept free from weeds, and in the following autumn transplanted into the nursery, where they may grow two or three years, and then be planted where they are to remain. If maple-trees are to be propagated by cuttings, they should be planted in autumn, if the ground is dry; but where the soil is cold and moist, the spring season is preferable. If cut from the trees before the buds begin to swell, and the ground is not then fit to receive them, they may be wrapped in moss, and put in a cool place, where they will keep a month or five weeks without injury; but the trees propagated from cuttings are not so valuable as those from seeds, because they seldom grow so large or so upright. Most, if not all the species of maples, take well by inoculation, or ingrafting on each other. Some of them are plain, and others variegated or striped with different colours, which by the means just now mentioned may be easily intermixed.

ACERB, a sour rough astringency of taste, such as that of unripe fruit.

ACERENZA. See CIRENZA.

ACERNO, a town of Italy, in the citior principal city of Naples, with a bishop's see. It is 17 miles S. W. of Conza, and 12 N. E. of Salerno. E. long. 15: 46. N. lat. 40. 50.

ACERNUM, a town of the Picentini, (Pliny;) now ACERNO.

ACERRA, in antiquity, an altar erected, among the Romans, near the gate of a person deceased, on which his friends daily offered incense till his burial.—The Chinese have still a custom like this: they erect an altar to the deceased in a room hung with mourning; and place an image of the dead person on the altar, to which every one that approaches it bows four times, and offers oblations and perfumes.

The *Acerra* also signified a little pot wherein were put the incense and perfumes to be burnt on the altars of the gods and before the dead. It appears to have been the same with what was otherwise called *thuribulum*, and *pyxia*.

We find mention of *Acerra* in the ancient church. The Jews had also their *Acerra*, in our version rendered *cenfers*; and the Romanists still retain them under the name of *incense-pots*. In Roman writers, we frequently meet with *plena acerra*, a full acerra: to understand which, it is to be observed, that people were obliged to offer incense in proportion to their estate and condition; the rich in larger quantities, the poor only a few grains; the former poured out *acerras* full on the altar, the latter took out two or three bits with their fingers.

ACCERA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavoro; situated on the river Agno, 7 miles N. E. of Naples, and 20 S. W. of Benevento. E. Lon. 15. 10. N. lat. 40. 55.

ACCERRÆ, the ancient name of a town on the Clanus, in Campania, not far from Naples, (Virgil;) now ACCERRA.—The same also of another town, (Plutarch, Polybius,) now called *la Gisola*, in the territory and to the south-east of Lodi, where the rivulet Serio falls into the Adda, to the west of Cremona and north of Placentia.

ACETABULUM, in antiquity, a measure used by the ancients, equal to one-eighth of our pint. It seems to have acquired its name from a vessel in which acetum or vinegar was brought to their tables, and probably contained about this quantity.

ACETABULUM, in anatomy, a cavity in any bone for receiving the protuberant head of another, and thereby forming that species of articulation called *enarthrosis*. See ANATOMY, n° 2, c.

ACETABULUM, in botany, the trivial name of a species of the *peziza*, or cup-*peziza*, a genus belonging to the cryptogamia fungi of Linnaeus. It has got the name of *acetabulum*, from the resemblance its leaves bear to a cup. See PEZIZA.

ACETARY. Nehemiah Grew, in his anatomy of plants, applies this term to a pulpy substance in certain fruits, *e. g.* the pear, which is inclosed in a congeries of small calculeous bodies towards the base of the fruit, and is always of an acid taste.

ACETIFICATION, a term used by chemists for the making of vinegar.

Acerrb
||
Acetary.

Acetosa,
or
Sorrel.

ACETOSA, Sorrel; by Linnaeus joined to the genus of Dock, under the title of *Rumex*: but as the plants have long been used in the kitchen, and sometimes in the shops, under the title of *Sorrel*, we chuse to preserve it; especially as, according to his method, they seem more properly ranked in his 224 class, intituled *Diacia*.—Of this genus there are reckoned eight

Species. 1. The pratensis, or common sorrel, grows naturally in pasture-grounds in most places of England and Scotland, so requires no description. It is also cultivated in gardens for culinary uses, where it produces large leaves, though it is generally small when growing in the fields. It is a perennial plant, and with proper management will continue many years. Its acidity gives it a considerable medicinal virtue in all putrid discaes*; and formerly an essential salt was extracted from it by evaporating the juice of the fresh plant. This was, however, very difficult to procure, and yielded only in small quantity; twenty pounds of the plant affording little more than two ounces of salt. What was worse, the salt when thus procured was inferior in virtue to the plant itself; so that this preparation is now entirely disused. This plant is fit for use all the year round. 2. The acetosella, or sheep's sorrel, grows naturally on dry banks, and on gravelly ground, where by its creeping roots it proves a very troublesome weed, so is not admitted into gardens. It possesses the same medicinal virtues with the former. 3. The scutata, round-leaved garden or French sorrel, is a more grateful acid than either of the former; so is preferably cultivated for culinary uses. About Paris it is cultivated in almost as great quantity as any other esculent plant. It has also been much cultivated in England since the introduction of French cookery; being an ingredient in many of their sauces and soups. 4. The digyna, or low creeping sorrel, grows naturally in the northern counties of England, Wales, and Scotland. The leaves have very short footstalks, are indented at both ends, and thick in proportion to their size. They grow near the ground, and seldom rise above six inches high. The roots creep in the ground, whereby it multiplies exceedingly in a proper situation. It is sometimes preserved in gardens for the sake of variety, but is not used in the kitchen, though it is applicable to the same purposes with the other species. 5. The alpina, or alpine sorrel, is full as hardy as the common, and fitter for the use of the kitchen, as having larger and more succulent leaves, of an equally grateful acid taste. 6. The vesicaria, or American annual sorrel, is kept in some gardens for variety, but is not of any use. It is a native of America and Egypt. 7. The rosea, or Egyptian sorrel, grows naturally only in that country; it has its name from the bladders of the seeds being of a fine rose colour. 8. The clunaria, or sorrel-tree, is a native of the Canary Islands, and rises with a strong woody stalk to the height of 10 or 12 feet. It is frequently kept in Britain in gardens. 9. The sterilis, or northern barren sorrel, is used for culinary purposes; and is preferable to the common kind, very rarely running to seed, and being fit for use all the year round.

Culture. Most species of sorrel may be propagated either by seeds, sown early in the spring on a moist shady border; or by parting the roots, either in spring

or autumn. The plants raised from the seeds, however, are more vigorous than those propagated from cuttings. They ought to be placed at a good distance from one another, so as to allow of digging the ground about each plant. French sorrel, particularly, spreads its roots so much, that the plants ought not to be placed at less than two feet distance from one another. It agrees better with an open situation than such as are natives of Britain. As the seed neither of French sorrel nor of the sorrel-tree ripens well in England, they can only be propagated from cuttings. The French sorrel thrives best on stony land, as it grows naturally on rocks. The sorrel-tree requires to be housed in winter, being unable to live in hard frost. If the cuttings are planted in a shady border any time in summer, and duly supplied with water, they will soon put out roots: upon which they must be immediately taken up, and planted in pots; for if permitted to remain in the border, they will soon grow so vigorous as to render their transplanting hazardous. When planted in pots, they should be placed in the shade, until they are again rooted; then they may enjoy the open air till October, when the frosts begin to be sharp; at which time they should be carried into the green-house, and treated in the same way as myrtles or other hardy green-house plants.

ACETOSELLA. See OXALIS.

ACETOUS, an epithet applied to such substances as are four or partake of the nature of vinegar.

ACETUM, vinegar, the vegetable acid of the chemists. See VINEGAR; and MATERIA MEDICA, n° 71. with the references *ib*.

ACETUM *Dillatatum*, distilled vinegar, or spirit of vinegar. See PHARMACY, n° 682.

ACETUM *Ejurientis*, a distilled vinegar, rectified by the help of verdigrease. It has obtained this name, because concentrated vinegar creates an appetite.

ACETUM *Radicatum*, is likewise used to denote concentrated vinegar; but Boerhaave thinks the *tartarus regeneratus* is the *acetum radicum* of the old chemists.

ACGLAH-SARAI, a town on the north shore of the Caspian sea.

ACH, or ACHE, in medicine, a term used for any severe pain; as Head-ach, Tooth-ach, &c.

ACHÆANS, the inhabitants of Achaia Propria†, a Peloponnesian state. This republic was not considerable in early times, for the number of its troops, nor for its wealth, nor for the extent of its territories; but it was famed for its probity, its justice, and its love of liberty. Its high reputation for these virtues was very ancient. The Crotonians and Sybarites, to re-establish order in their towns, adopted the laws and customs of the Achæans. After the famous battle of Leuctra, a difference arose betwixt the Lacedæmonians and Thebans, who held the virtue of this people in such veneration, that they terminated the dispute by their decision. The government of the Achæans was democratical. They preserved their liberty till the time of Philip and Alexander. But in the reign of those princes, and afterwards, they were either subject to the Macedonians, who had made themselves masters of Greece, or oppressed by cruel tyrants. The Achæan commonwealth consisted of twelve inconsiderable towns in Peloponnesus. Its first annals are not marked by any great action, for they are not graced with one eminent character.

Acetosa
||
Achæans.

* See *Materia Medica*, n° 69.

† See *Achaia*.

Achæans
||
Achaia.

character. After the death of Alexander, this little republic was a prey to all the evils which flow from political discord. A zeal for the good of the community was now extinguished. Each town was only attentive to its private interest. There was no longer any stability in the state; for it changed its masters with every revolution in Macedonia. Towards the 124th Olympiad, about the time when Ptolemy Soter died, and when Pyrrhus invaded Italy, the republic of the Achæans recovered its old institutions and unanimity. The inhabitants of Patra and of Dymæ were the first assertors of ancient liberty. The tyrants were banished, and the towns again made one commonwealth. A public council was instituted, in which affairs of importance were discussed and determined. A register was appointed to record the transactions of the council. This assembly had two presidents, who were nominated alternately by the different towns. But instead of two presidents, they soon elected but one. Many neighbouring towns which admired the constitution of this republic, founded on equality, liberty, the love of justice, and of the public good, were incorporated with the Achæans, and admitted to the full enjoyment of their laws and privileges.—The arms which the Achæans chiefly used, were slings. They were trained to the art from their infancy, by slinging from a great distance, at a circular mark of a moderate circumference. By long practice they took so nice an aim, that they were sure, not only to hit their enemies on the head, but on any part of the face they chose. Their slings were of a different kind from those of the Bælearians, whom they far surpassed in dexterity.

ACHÆL, (Achæans); the inhabitants of Achaia Propria. In Livy, the people of Greece; for the most part called *Achioli*, by the Roman poets. In Homer, the general name for Grecians.

ACHÆMENES, according to Herodotus, was father of Cambyses, and grandfather of Cyrus the first, king of Persia. Most of the commentators of Horace are of opinion, that the Achæmenes whom that poet mentions, ode xii. of his 2^d book, was one of the Persian monarchs: but, if that were true, he must have reigned before the Medes subdued the Persians; for we do not hear of any king of that name from the time that the Persians founded that great monarchy, which is looked upon as the second universal one. However this be, the epithet *Achæmenius* is frequently given to the Persians, in the old Latin poets.

ACHÆMENES, son of Darius I. king of Persia, and brother of Xerxes, had the government of Egypt bestowed on him, after Xerxes had forced the Egyptians to return to their allegiance. He some time after commanded the Egyptian fleet in the celebrated expedition which proved so fatal to all Greece. The Egyptians having again taken up arms after the death of Xerxes, Achæmenes was sent into Egypt to suppress the rebellion; but was vanquished by Inarus, chief of the rebels, succoured by the Athenians.

ACHEUS, cousin-german to Seleucus Ceraunus and Antiochus the Great, kings of Syria, became a very powerful monarch, and enjoyed the dominions he had usurped for many years; but at last he was punished for his usurpations in a dreadful manner, in the

* Lib. viii. 140th year of Rome, as related by Polybius *.

cap. s. 6.

ACHAIA, a name taken for that part of Greece

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which Ptolemy calls *Hellas*; the younger Pliny, *Grecia*; now called *Livadia*: bounded on the north by Thessaly, the river Sperchius, the Sinus Maliacus, and mount Oeta; on the west by the river Achelous; on the east, turning a little to the north, it is washed by the Archipelago, down to the promontory of Sunium; on the south, joined to the Peloponnesus, or Morea, by the isthmus of Corinth, five miles broad. See LIVADIA.

ACHAIA PROPRIA, anciently a small district in the north of Peloponnesus, running westward along the bay of Corinth, and bounded on the west by the Ionian Sea, on the south by Elis and Arcadia, on the east by Sicyonia: inhabitants, the *Achæans**, properly so called; its metropolis, *Patra*. It is now called *Romania Alia*, *Achaia*. * See Achaia.

Achaia was also taken for all those countries that joined in the Achæan league, reduced by the Romans to a province. Likewise for Peloponnesus.

ACHAÏE PRESBYTERI, or the Presbyters of Achaia, were those who were present at the martyrdom of St Andrew the apostle, A. D. 59; and are said to have written an epistle in relation to it. Bellarmine, and several other eminent writers in the church of Rome, allow it to be genuine; while Du Pin, and some others, expressly reject it.

ACHAÏUS, son of Ethwin, was raised to the crown of Scotland after the death of Soluati, A. D. 788. The emperor Charlemagne sent an embassy to desire an alliance with him against the English, whose pirates so infested the seas, that the merchants could not carry on their trade. This alliance was concluded in France upon conditions so advantageous to the Scots, that Achaïus, to perpetuate the memory of it, added to the arms of Scotland a double field fowed with lilies. He died in 819.

ACHAN, the son of Carmi, of the tribe of Judah, at the taking of Jericho concealed two hundred shekels of silver, a Babylonish garment, and a wedge of gold, contrary to the express command of God. This sin proved fatal to the Israelites, who were repulsed at the siege of Ai. In this dreadful exigence, Joshua prostrated himself before the Lord, and begged that he would have mercy upon his people. Achan was discovered by casting lots, and he and his children were stoned to death. This expiation being made, Ai was taken by stratagem. Josh. vii. 8, 9.

ACHARACA, anciently a town of Lydia, situate between Tralles and Nyfa; in which were the temple of Pluto, and the cave Charonum, where patients slept in order to obtain a cure.

ACHAT, in law, implies a purchase or bargain. And hence probably purveyors were called *Achators*, from their making bargains.

ACHATES, the companion of Eneas, and his most faithful friend, celebrated in Virgil.

ACHATES, (Sil. Italicus); a river of Sicily, now the *Drillo*, (Cluverius); which runs from north to south, almost parallel with, and at no great distance from, the Gela; and rises in the north of the territory of Noto. It gave name to the Achates, or Agate, said to be first found there.

ACHAZIB, or ACHZIB, a town of Galilee, in the tribe of Asher, nine miles from Ptolemais.—Also a town in the more northern parts of the tribe of Judah.

ACHELOUS, in fabulous history, wrestled with Hercules,

G

Hercules,

Achaia
||
Achelous.

Achelous
||
Acheron.

Hercules, for no less a prize than Deianira, daughter to king Oeneas; but as Achelous had the power of assuming all shapes, the contest was long dubious: at last, as he took that of a bull, Hercules tore off one of his horns; so that he was forced to submit, and to redeem it by giving the conqueror the horn of Amalthea, the fame with the Cornucopia or horn of plenty; which Hercules having filled with a variety of fruits, consecrated to Jupiter. Some explain this fable, by saying, That Achelous is a winding river of Greece, whose stream was so rapid, that it roared like a bull, and overflowed its banks; but Hercules, by bringing it into two channels, broke off one of the horns, and so restored plenty to the country. See the next article.

ACHELOUS, a river of Acarnania; which rises in mount Pindus, and, dividing Ætolia from Acarnania, falls from north to south into the Sinus Corinthiacus. It was formerly called *Thaon*, from its impetuosity, and *king of rivers*, (Homer.) The epithet *Achelous* is used for *Aqueus*, (Virgil;) the ancients calling all water *Achelous*, especially in oaths, vows, and sacrifices, according to Ephorus: Now called *Aspro Potamo*. Rivers are by the ancient poets called *Tauriformes*, either from the bellowing of their waters, or from their ploughing the earth in their course: Hercules, restraining by dykes and mounds the inundations of the *Achelous*, is said to have broken off one of his horns, and to have brought back plenty to the country. See the preceding article.

ACHELOUS, a rivulet of Thessaly, running by the city Lamia, (Strabo, Pausanias.) Also a river of Peloponnesus, running by Dyme, in Achaia, (Strabo); and by mount Lycæus in Arcadia, (Pausanias.)

ACHERI (LUKE p.) a learned Benedictine of the congregation of St Maur, was born at St Quintin, in Picardy, in 1609; and made himself famous by printing several works, which till then were only in manuscript: particularly, The epistle attributed to St Barnabas; The works of Lanfrank, archbishop of Canterbury; A collection of scarce and curious pieces, under the title of *Spicilegium*, &c. Gleanings, in thirteen volumes, quarto. The prefaces and notes, which he annexed to many of these pieces, shew him to be a man of genius and abilities. He had also some share in the pieces inserted in the first volumes of The acts of the saints of the order of St Bennet, the title whereof acquaints us that they were collected and published by him and father Mabillon. After a very retired life, till the age of 73, he died at Paris the 29th of April 1685; in the abbey of St Germain in the fields, where he had been librarian.

ACHERON, a river of Epirus. The poets feigned it to have been the son of Ceres, whom she hid in hell for fear of the Titans, and turned into a river, over which souls departed were ferried in their way to Elysium.

ACHERON, a river of Thesprotia, in Epirus; which, after forming the lake Acherusia, at no great distance from, falls into the sea near, the promontory of Chimerium, to the west of the Sinus Ambracius, in a course from north to south.

ACHERON, or ACHEROS, a river of the Bruttii in Italy, running from east to west; where Alexander king of Epirus was slain by the Lucani, being deceived by the oracle of Dodona, which bid him beware of Acheron.

Achernee
||
Achillea.

ACHERNER, in astronomy, a star of the first magnitude in the southern extremity of the constellation Eridanus. Its longitude is 11°. 48". 20". of Pisceæ, and its latitude 32°. 46". 3'. S.

ACHERUSIA PALUS, a lake between Cumæ and the promontory Misenum, now *il Lago della Colucia*, (Cluverius.) Some confound it with the *Lacus Lucrinus*, and others with the *Lacus Avernus*. But Strabo and Pliny distinguish them. The former takes it to be an effusion, exundation, or washes of the sea, and therefore called by Lycophron, *Ἀχέρουσα θάλασσα*.—Also a lake of Epirus, through which the Acheron runs.—There is also an *Acherusia*, a peninsula of Bithynia on the Euxine, near Heraclea; and a cave there of the same name, through which Hercules is fabled to have defended to hell to drag forth Cerberus.

ACHIA, a kind of cane that grows in the East Indies, which is pickled green in the country, with strong vinegar, pepper, and some other spice and ingredients. This pickle comes to Europe in a sort of earthen jars, about a foot high, and the same in breadth, growing narrower at the mouth. The bits of cane are an inch and a half in diameter, and a little above two inches long, almost of the same consistency with pickled cucumbers. They are of a pale yellow colour; and, instead of pulps, their inside is a close, fibrous substance, like that of the common canes when the outside coat is off. The Dutch bring home great quantities of this pickle, which their cold climate makes them think wholesome. They generally eat it towards the end of their meals, judging it very good to quicken the appetite, and strengthen the stomach.

ACHIAH, is a Malayan word, which signifies all sorts of fruits and roots pickled with vinegar and spice. The Dutch import from Batavia all sorts of achiah, which the Chinese make after the manner of the Malaysians; but particularly that of bamboo, a kind of cane, extremely thick, which grows in the East-Indies, and is preserved there, whilst it is still green, with very strong vinegar and spice. This is called *Bambocachiah*. The name changes according to the fruit with which the achiah is made.

ACHILLÆA, YARROW, MILFOIL, or NOSEBLEED; a genus of the order of the polygamia superflua, belonging to the fyncgenesis class of plants. The following are the principal

Species. 1. The millefolium, or common yarrow, is found naturally on banks, and by the sides of foot-paths, in moist parts of England. It most commonly bears white flowers, though a variety of it is found which bears purple ones. These, however, do not long continue to bear flowers of this colour, if transplanted into gardens. It was formerly used in medicine; but though it may still have a place in some dispensatories, no physician of any note expects any virtue from it, or ever prescribes it. It creeps greatly by its roots, and also multiplies by the seeds, so that it becomes a troublesome weed where it is once allowed to get a footing. The cultivation of it is recommended by Mr Anderson, in his Essays on Agriculture, as a proper food for cattle. 2. The fantolina, or eastern sneezewort, is sometimes cultivated in gardens; it has large yellow flowers, which stand upon pretty long footstalks placed singly, not in bunches as in the common kind. It has leaves like lavender-cotton, which,

Achillea,
or
Yarrow, &c.

which, when rubbed, emit a strong oily odour. The flowers appear in June and July. 3. The tomentosa, or woolly yarrow, is a native of the south of France and Spain, but lives in the open air in England. The flowers are of a bright yellow, and continue long in beauty, growing in clusters at the top of the stalks, which seldom rise above a foot high. The leaves are finely cut, and very hoary. 4. The abrotanifolia, or tall caftera yarrow, is a native of the iflands in the Archipelago: it grows to the height of two feet and a half, with large umbels of yellow flowers on the top; the leaves refemble thofe of the common wormwood, and are cut into long narrow fegments. 5. The clavena, or Alpine umbelliferous wormwood, takes its name from the mountains of which it is a native. It feldom grows above fix or feven inches in height; it fupports umbels of white flowers, like thofe of the common sneezwort, which appear in April and May. The leaves are filvery, and fhaped like thofe of wormwood, which often decay in the autumn and winter. 6. The tanacetifolia, or eaftern sneezwort, with tanfey leaves, is a very humble plant, feldom rifing above fix inches in height. The flowers are nearly as large as thofe of the common sneezwort, white, and growing in flat umbels. They appear in June and July. The leaves of the plant have fome likenefs to thofe of the common wormwood, are very hoary, grow clofe to the ground, and decay in autumn fo as to make little appearance in winter. Like the laft fpecies, this is a native of the Alps. 7. The ageratum, or sweet maudlin, was formerly much ufed in medicine and for culinary purpofes; but has now fallen fo much into neglect as to be totally unknown in the markets; fo that when it is demanded, the white maudlin is fubftituted in its ftead. The reafon of this fubftitution was, that the latter is more hardy and eafily propagated than the sweet maudlin, which is apt to rot in wet winters. The common maudlin flowers in June and July, and the feeds are ripe in September. 8. The Egyptiaca, or hoary sneezwort, is a native of the Archipelago. It hath very hoary leaves, which remain all the year; and the plants growing clofe and low, make a pretty appearance at all feafons. The flowers are yellow, and are produced in umbels on the top of the ftalks; they appear in June, and continue till the end of Sep. ember. 9. The ptarmica, or common sneezwort, grows wild in the woods, and other fhady places, in many parts of England; fo is not admitted into gardens. There is a variety, however, with double flowers, which is preferved in gardens, and is commonly known by the name of double maudlin. This fpecies creeps greatly by the roots, fo as foon to overfpread a large fpace of ground. If planted in pots, fo as to confine its roots from creeping, the ftalks grow clofe together, and make a tolerable appearance when in flower; but when at a diftance, fo that the roots have full liberty to run, the flowers appear but indifferently. 10. The macrophylla, or Alpine sneezwort, with feverfew leaves, is a native of the Alps. It produces many ftalks rifing near three feet high; having loofe branching umbels of white flowers on their top, refembling thofe of the common sneezwort, but larger. 11. The nana, or hoary Alpine milfoil, is likewife a native of the Alps; the leaves are hoary, and the umbels of its flowers are more compact than the former; the ftalks do not rife more than a foot high.

12. The nobilis, or Sweet milfoil, approaches to the nature of the common milfoil; but its leaves are of a paler green, and are neither fo long nor fo much cut off as thofe of the common milfoil are: they have a strong sweet fcent when bruifed. 13. The alpina, or white maudlin, bears fome refemblance to the common sneezwort; but the leaves are longer, of a deeper green colour, and deeply indented in their edges; the flowers are white, and the roots creep far under ground. The plant will rife, in good land, to the height of four feet.

Culture. All the forts of yarrow are eafily propagated by feeds, which may be fown either in the fpring or autumn, upon a bed of common earth. When the plants come up, and are strong enough for tranfplanting, they fhould be planted in beds in the nurfery, where they may continue till autumn, when they fhould be tranfplanted to the places where they are to remain. The Archipelago kinds, however, are often destroyed by fevere froft; fo they ought to be fheltered during the winter. Thefe kinds alfo rarely bring their feeds to perfection in England; they are therefore to be propagated by flips, which may be taken off and planted in a fhady border any time in fummer, when they will take root in about fix weeks, and then may be tranfplanted where they are to remain.

ACHILLEA, a name frequently given by the ancients to the gum called dragons-blood. See DRAGONS-BLOOD.

ACHILLEID, ACHILLEIS, a celebrated poem of Statius, in which that author propofed to deliver the whole life and exploits of Achilles; but being prevented by death, he has only treated of the infancy and education of his hero. See STATIUS.

ACHILLES, in fabulous hiftory, one of the greateft heroes of ancient Greece, was the fon of Peleus and Thetis. He was a native of Phthia, in Thel-faly; and, according to the poets, his mother fed him by day with ambrofia, and by night covered him with celestial fire. She dipped him alfo in the waters of the river Styx, by which his whole body became invulnerable, except that part of his heel by which he held him; and afterwards intrufted him to the care of the centaur Chiron, who, to give him the ftrength neceffary for martial toil, fed him with honey, and the marrow of lions and wild boars, &c. To prevent his going to the fiege of Troy, the difguifed him in female apparel, and hid him among the maidens at the court of king Lycomedes: but Ulyffes difcovering him, perfuaded him to follow the Greeks. Achilles diftinguifhed himfelf by a number of heroic actions at the fiege. Being difgufted, however, with Agamemnon for the lofs of Brifcis, he retired from the camp. But returning to avenge the death of his friend Patroclus, he flew Hector, fiftened his corpie to his chariot, and dragged it round the walls of Troy. At laft Paris, the brother of Hector, wounded him in the heel with an arrow, while he was in the temple treating about his marriage with Philoxena, daughter to king Priam. Of this wound he died, and was interred on the promontory of Sigæum; and after Troy was taken, the Greeks facrificed Philoxena on his tomb. It is faid, that Alexander, feeing this tomb, honoured it by placing a crown upon it; at the fame time crying out, that "Achilles was happy in having, during his life, fuch a friend as Patroclus; and, after his death, a

Achillea

Achilles.

Pl. II. 66. 1.

Achilles "poet like Homer." Achilles is supposed to have died 1183 years before the Christian æra.

ACHILLES TATIUS. See TATIUS.

Tendo ACHILLIS, in anatomy is a strong tendinous cord formed by the tendons of several muscles, and inserted into the os calcis*. It has its name from the fatal wound Achilles is said to have received in that part from Paris the son of Priam.

ACHILLINI (Alexander), born at Bologna, and doctor of philosophy in that university. He flourished in the 15th and 16th centuries, and by way of eminence was styled the Great Philosopher. He was a steadfast follower and accurate interpreter of Averroes upon Aristotle, but most admired for his acuteness and strength of arguing in private and public disputations. He made a surprising quick progress in his studies, and was very early promoted to a professorship in the university, in which he acquitted himself with so much applause that his name became famous throughout all Italy. He continued at Bologna till the year 1506; when the university of Padua made choice of him to succeed Antonio Francatiano in the first chair of philosophy, and his fame brought vast numbers of students to his lectures at Padua: but the war, wherein the republic of Venice was engaged against the league of Cambray, putting a stop to the lectures of that university, he withdrew to his native country, where he was received with the same marks of honour and distinction as before, and again appointed professor of philosophy in Bologna. He spent the remainder of his life in this city, where he died, and was interred with great pomp in the church of St Martin the Great, which belongs to the Carmelite friars. Jovius, who knew Achillini, and heard his lectures, says, that he was a man of such exceeding simplicity, and so unacquainted with address and flattery, that he was a laughing-stock to the pert and faucy young scholars, although esteemed on account of his learning. He wrote several pieces on philosophical subjects, which he published, and dedicated to John Bentivogli.

ACHILLINI (Claudius), grandson of the former, read lectures at Bologna, Ferrara, and Parma; where he was reputed a great philosopher, a learned divine, an excellent lawyer, an eloquent orator, a good mathematician, and an elegant poet. He accompanied Cardinal Ludovino, who went as legate into Piedmont; but being afterward neglected by this cardinal, when he became pope under the name of Gregory XV. he left Rome in disgust, and retired to Parma; where the duke appointed him professor of law, with a good salary. He published a volume of Latin Letters, and another of Italian Poems, which gained him great reputation: he died in 1640, aged 66.

ACHIOTTE, or ΑΧΙΟΤΙ, a foreign drug, used in dying, and in the preparation of chocolate. It is the same with what the French commonly call *Rocou*, and the Dutch *Orleanse*. It has been commonly esteemed a kind of argilla, or earth; but later observers find it a flower, or seed of a tree*, which grows chiefly in very hot countries, as Yucatan, and Campechy, and Guatimala. It is about the size of a plumb-tree, but more tufted; and its branches being longer than the trunk. The fruit is inclosed in a rind like a chestnut, except that it is of an oval figure. It begins to open crockwise from the middle to the top; and subdivides

into four parts, having in the middle a beautiful carnation-coloured flower. The tree has no leaves; but instead thereof shoots out filaments like those of fasson, only bigger and longer. Between these grow little soft vermilion-coloured grains, about the size of pepper-corns; which the Indians, separating from the filaments, bake in cakes of about half a pound each; in which form the drug is brought into Europe. The poor people use Achiotte instead of fasson: others mix it as an ingredient in chocolate, during the grinding of the cacao, the quantity of two drams to a pound, to give it a reddish colour, &c. though this practice was formerly more frequent than at present, the opinion of its being an earth, which even Mr Ray fell into, having discredited its use. Some also use it to dye wax of a vermilion colour. Physicians hold it a good cordial, and preservative against suppression of urine. F. Labat describes the achiotte somewhat differently; especially the preparation of it for dying. The tree, according to him, produces yearly its crops of flowers, of a carnation colour; not unlike wild roses. These are succeeded by a kind of rough pods, or fruit resembling chestnuts, full of small grains; which being fermented in water, and this water afterwards passed through a carribbe sieve, it contracts a red colour. It is then boiled, cummed, set on the fire again, and stirred; till at length it thickens, and will fall loose from the spatula; which is the Achiotte or Rocou in perfection; though to make it more beautiful, they have two further processes, which are described by F. Labat*. According to Savary, to procure the Achiotte, they shake out the grains in an earthen vessel, soak and then wash them in several repeated warm waters, till they have discharged all their vermilion colour: after which, letting the water stand to settle, the fecula at the bottom is taken and formed into little cakes and balls; which when pure, and not adulterated either with red earth, or fine brick-dust, are highly valued. Some also use fire to boil the Achiotte, and give it a farther consistence.

ACHISH, king of Gath, to whom David retired; and who gained a complete victory over Saul, which was fatal both to that prince and his son Jonathan.

AHITOPHEL, a counsellor, who, revolting from David king of Israel, sided with his rebellious son Absalom; to whom he gave crafty advice, which not being complied with, he hanged himself.

ACHLAR, a river of the greater Armenia, otherwise called *Arafs*, *Caiaz*, and by the ancients *Araxis*.

ACHMETSCHET, a town of the peninsula of the Crimea, the residence of the sultan Galga, who is eldest son of the Khan of Tartary. Long, 51. 20. Lat. 45. 0.

ACHMET, son of Sarim, has left a book concerning the interpretation of dreams according to the doctrine of the Indians, Persians, and Egyptians, which was transcribed out of Greek into Latin by Leo Tufcon in 1160. He lived in the 9th century.

ACHMET GEDUC, a famous general under Mahomet II. and Bajazet II. in the 15th century. When Mahomet II. died, Bajazet and Zezan both claimed the throne: Achmet sided with the former, and by his bravery and conduct fixed the crown on his head. But Bajazet took away his life; shining virtue being always an unpardonable crime in the eyes of a tyrant.

ACHONRY, a small town of Ireland, in the province

Achiotte
Achony.

* Mem. de
Trev. 1722.
p. 637.

* viz. The
mitella di-
phylla. See
Mistla.

vince of Connaught and county of Sligo, seated on the river Shannon.

ACHOR, a valley of Jericho, lying along the river Jordan, not far from Gilegal; so called from Achan, the troubler of Israel, being there stoned to death.

ACHOR, in medicine. Trallian says it is a sore on the outside of the head, full of little perforations, which discharge a humour like ichor, whence its name. He further says, that the cerion resembles an achor; but that the mouths of the perforations are larger, resembling the cells of a honey-comb, whence the name; the matter is also nearly of the consistence of thin honey. When these diseases spread, the serum which oozes out dries, and forms a scab.—The achor differs from the favus and tinca only in the degree of virulence. It is called *favus* when the perforations are large, and *tinea* when they are like those which are made by moths in cloth. But generally by tinea is understood a dry scab on the hairy scalp of children, with thick scales and an offensive smell. When this disorder affects the face, it is called *crusta lactea*; which, when it happens to children, if in other respects they are healthy, the best treatment, besides keeping the belly moderately lax, is cleanliness and a moderate diet; an issue may be made, and continued till the disorder is cleared and the strength of the constitution is established, keeping the hair short and washing the head with soap fuds.—Some instances of this sort are very difficult of cure, and attended with violent itching, a pale countenance, &c. but still the same method generally succeeds in all the species and degrees of virulence. Small doses of calomel † may be given as an alterative, rather than as a laxative; and the vin. antim. ‡ in such doses, at proper intervals, as the stomach will easily retain. Externally, the unguent *è pice* † may be used two or three times in a week, or cream mixed with salt in fine powder. If the humour is repelled, give warm sudorifics until it return.—Writers of medical observations afford divers anomalous instances of achores, viz. Some found even in aged people; some not on the head, but the feet; others resembling the venereal disease; others which disappeared upon cutting the hair, and returned on its growing anew; others followed by a thickness of hearing, others by panniculi, and others by a gutta serena. Their drying up has sometimes been followed by a fever, their repulsion inwards by an epilepsy.

ACHRADINA, (Plutarch, Cicero, Livy); one of the four cities or divisions of Syracuse, and the strongest, largest, and most beautiful part of it; separated by a very strong wall from the outer town, *Tycha* and *Neapolis*. It was adorned with a very large forum, with beautiful porticos, a most elegant prytæneum, a spacious senate-house, and a superb temple of Jupiter Olympius. (Plutarch.)

ACHRAS. See SAPOTA.

ACHROMATIC an epithet expressing want of colour. The word is Greek, being compounded of a privative, and *χρῶμα* colour.

ACHROMATIC Telescopes. See OPTICS, n° 20.

ACHYR, a strong town and castle of the Ukurin, subject to the Russians since 1667. It stands on the river Uorklo near the frontiers of Russia, 127 miles W. of Kiow, Long. 36. o. Lat. 49. 32.

ACHRYANTHES, in botany, a genus of the pentandria order, belonging to monogynia class of plants.

There are seven species, all natives of the Indies. Only one of them, the amaranthus, is commonly cultivated in botanical gardens, and that more for the sake of variety than beauty. This species grows to the height of three feet, with oblong pointed leaves. The flowers come out in long spikes from the extremities of the branches, and appear in July, the seeds ripening in September. Plants of this kind must be reared in a hot-bed, and may be transplanted when they have acquired sufficient strength. If kept in pots, and sheltered during the winter in a warm green-house, they will live two or three years.

ACHZIB. See ACHAZIB.

ACHULÆ, the small pikes or prickles of the hedge-hog, echinus marinus, &c.

ACIDALUS, a fountain in Orchomenus a city of Boeotia, in which the Graces, who are sacred to Venus, bathed. Hence the epithet *Acidalia*, given to Venus, (Virgil.)

ACIDS, substances which give a sour, sharp, or tart taste. Among the chemists, the acid salts are distinguished into the nitrous, vitriolic, muriatic, and vegetable. See CHEMISTRY, n° 22, 76, 103.

ACIDS, in the Materia Medica, are such medicines as possess an acid quality. See MAT. MED. n° 10.

ACIDALIUS (Valens,) would, in all probability, have been one of the greatest critics in these latter ages, had he lived longer to perfect those talents which nature had given him. He was born at Wittstock, in Brandenburg; and having visited several academies in Germany, Italy, and other countries, where he was greatly esteemed, he afterwards took up his residence at Breslaw, the metropolis of Silesia. Here he remained a considerable time, in expectation of some employment; but nothing offering, he turned Roman-catholic, and was chosen rector of a school at Nieffa. It is related, that about four months after, as he was following a procession of the host, he was seized with a sudden phrenzy; and being carried home, expired in a very short time. But Thuanus tells us, that his excessive application to study was the occasion of his untimely death; and that his sitting up a-nights in composing his Conjectures on Plautus, brought upon him a distemper which carried him off in three days, on the 25th of May 1595, being just turned of 28. He wrote a Commentary on Quintus Curtius; also, Notes on Tacitus, on the Twelve Panegyrics; besides speeches, letters, and poems. His poetical pieces are inserted in the *Deliciae* of the German poets, and consist of epic verses, odes, and epigrams. A little piece, printed in 1595, under the title of *Mulieres non esse homines*, "That women were not of the human species," was falsely ascribed to him. But the fact was, that Acidalius happening to meet with the manuscript, and thinking it very whimsical, transcribed it, and gave it to the bookseller, who printed it. The performance was highly exclaimed against, inasmuch that the bookseller being seized, he discovered the person who gave him the manuscript, and a terrible outcry was made against Acidalius. A story goes, that being one day to dine at a friend's house, there happened to be several ladies at table, who supposing him to be the author, were moved with so much indignation, that they threatened to throw their plates at his head. Acidalius, however, ingeniously diverted their wrath. In his opinion, he said, the

† See
Pharmacy,
p° 762.
‡ Ibid.
n° 364.
§ Ibid.
p° 513, b.

Acidity
↓
Acme.

the author was a judicious person, the ladies being certainly more of the species of *angels* than of *men*.—Mr Baillet has given him a place among his *Enfants Célestes*; and says, that he wrote a comment upon Plautus when he was but 17 or 18 years old, and that he composed several Latin poems at the same age.

ACIDITY, that quality which renders bodies acid.

ACIDULÆ. Mineral waters that contain a brisk spirit, when unaccompanied with heat, are thus named; but if they are hot also, they are called *therme* *.

* See Water.

ACIDULATED, a name given to medicines that have an acid in their composition.

ACILA, (Strabo;) ΟCILA, (Pliny;) and OCELIS, (Ptolemy;) a staple or mart town in Arabia Felix, on the Arabic gulf, from which, according to Pliny, they fet sail for India. Now *Ziden*.

ACILIUS GLABRIO (Marcus), consul in the year of Rome 662, and 211 years before the Christian æra, distinguished himself by his bravery and conduct in gaining a complete victory over Antiochus the Great, king of Syria, at the Streights of Thermopylæ in Thessaly, and on several other occasions. He built the Temple of Piety at Rome, in consequence of a vow he made before the above-mentioned battle; and the reason of his giving it that name, is very remarkable. The story is mentioned by Pliny, Valerius Maximus, and others †.

† See the article Piety.

ACINIPPO, a town of Bætica, (Pliny;) its ruins, called *Ronda la Vieja*, are to be seen near Arunda, in the kingdom of Granada.

ACINUS, or ACINI, the small protuberances of mulberries, strawberries, &c. and by some applied to grapes. Generally it is used for those small grains growing in bunches, after the manner of grapes, as Legustrum, &c.

ACIS, in fabulous history, the son of Faunus and Simethis, was a beautiful shepherd of Sicily, who being beloved by Galatea, Polyphemus the giant was so enraged, that he dashed out his brains against a rock; after which Galatea turned him into a river, which was called by his name.

ACIS, (Ovid, Theocritus;) a river of Sicily, running from a very cold spring, in the woody and shady foot of mount *Ætna*, eastward into, and not much above a mile from, the sea, along green and pleasant banks, with the speed of an arrow, from which it takes its name. It is now called *Acì Iaci*, or *Chiaci*, according to the different Sicilian dialects: Antonine calls it *Acirus*. Also the name of a hamlet at the mouth of the *Acir*.

ACKNOWLEDGMENT, in a general sense, is a person's owning or confessing a thing; but, more particularly, is the expression of gratitude for a favour.

ACKNOWLEDGMENT-*Money*, a certain sum paid by tenants, in several parts of England, on the death of their landlords, as an acknowledgment of their new lords.

ACLIDES, in Roman antiquity, a kind of missive weapon, with a thong affixed to it, whereby to draw it back. Most authors describe it as a sort of dart or javelin; but Scaliger makes it roundish or globular, with a slender wooden stem to poise it by.

ACLOWA, in botany, a barbarous name of a species of colutea; see COLUTEA. It is used by the natives of Guinea to cure the itch: They rub it on the body, as we do unguents.

ACME, the top or height of any thing. It is usually applied to the maturity of an animal just before

it begins to decline; and physicians have used it to express the utmost violence or crisis of a disease.

ACMONIA, and ACMONIA, in Peutinger's map, a town of Phrygia Major, now in ruins. The inhabitants are called *Acmonenses* by Cicero, and the city *Civitas Acmonensis*. Also a city of Dacia, (Ptolemy,) on the Danube, near the ruins of Trajan's bridge, built by Severus, and called *Severicum*; distant 12 German miles from Temeswar, to the south-east.

ACNIDA, VIRGINIAN HEMP, in botany, a genus of the diœcia order, belonging to the pentandria class of plants. There is only one species of it, *viz.* the acnida canadica. It is a native of Virginia; but rarely cultivated in Europe, except for the sake of variety. It has little beauty, and at present is applied to no useful purpose.

ACNUA, in Roman antiquity, signified a certain measure of land, near about the English rood, or fourth part of an acre.

ACOMETÆ, or ACOMETI, in church-history; or, Men who lived without sleep; a set of monks who chaunted the divine service night and day in their places of worship. They divided themselves into three bodies, who alternately succeeded one another, so that their churches were never silent. This practice they founded upon the precept, *Pray without ceasing*. They flourished in the east about the middle of the 5th century. There are a kind of acometi still subsisting in the Roman church, *viz.* the religious of the holy sacrament, who keep up a perpetual adoration, some one or other of them praying before the holy sacrament day and night.

ACOLUTHI, or ACOLUTHISTS, in antiquity, was an appellation given to those persons who were steady and immovable in their resolutions: and hence the stoics, because they would not forsake their principles, nor alter their resolutions, acquired the title of Acoluthi. The word is Greek, and compounded of *α*, priv. and *κλῆσις*, way; as never turning from the original course.

ACOLUTHI, among the ancient Christians, implied a peculiar order of the inferior clergy in the Latin church; for they were unknown to the Greeks for above 400 years. They were next to the sub-deacon; and we learn from the fourth council of Carthage, that the archdeacon, at their ordination, put into their hands a candlestick with a taper, giving them thereby to understand that they were appointed to light the candles of the church; as also an empty pitcher, to imply that they were to furnish wine for the eucharist. Some think they had another office, that of attending the bishop wherever he went. The word is Greek, and compounded of *α*, priv. and *κλῆσις*, to hinder or disturb.

ACOLYTHIA, in the Greek church, denotes the office or order of divine service; or the prayers, ceremonies, hymns, &c. whereof the Greek service is composed.

ACOMA, a town of North America, in New Mexico, seated on a hill, with a good castle. To go into the town, you must walk up 50 steps cut out of the rock. It is the capital of that province, and was taken by the Spaniards in 1599. W. Long. 104. 15. Lat. 35. 0.

ACOMAC, the name of a county in Virginia. It is on the eastern side of Chesapeake bay, on a slip of land, by the Virginians called the *eastern shore*. It is

Acolithi
↓
Acomac.



*Fig. 1. ACHILLEA NOBILIS or
Purple Tansy leaved Yarrow*



Fig. 2.
ACONITUM PYRENAICUM

*or
Yellow Pyrenean Monkshood*



Aconi-
natus,
Aconitum.

Aconitum
||
Acorus.

a large county, and yet contains but one parish, the inhabitants being but thin at present, and scattered up and down in distinct settlements.

ACOMINATUS (Nieetas), was secretary to Alexius Comnenus and to Isaacus Angelus successively: he wrote an history from the death of Alexius Comnenus in 1118, where Zonaras ended his, to the year 1203, which has undergone many imprecisions, and is much applauded by the best critics.

ACONITUM, ACONITE, WOLFSBANE, or MONKSHOOD; a genus of the trigynia order, belonging to the polyandria class of plants. There are 10

Species. 1. The lycoctonum, or yellow wolfsbane, grows upwards of three feet high, flowers about the middle of June, and if the season is not warm will continue in flower till August. 2. The altissimum, or greatest yellow wolfsbane, grows upwards of four feet high, and the spikes of its flower are much longer in this sort than the former. 3. The variegatum, or lesser wolfsbane, seldom grows more than two feet high; it carries blue flowers, and the spikes of them are much shorter than either of the two last. 4. The anthora, or wholesome wolfsbane, flowers in the middle of August, and often continues in beauty till the middle of September; its flowers are not large, but are of a beautiful sulphur-yellow colour. 5. The napellus, bears large blue flowers, which appear in August, and make a pretty appearance. There are two or three varieties of this kind; one with white, another with rose-coloured, and a third with variegated flowers; but these are only varieties which often change. 6. The pyramidale, or common blue monkhood, bears a long spike of blue flowers, which appear sooner than any of the other sorts, being so early as June, or sometimes even May. The spikes of flowers are upwards of two feet long, so that it makes a pretty appearance; the seeds are ripe in September. 7. The alpinum, or large-flowered monkhood, flowers in August, and will grow to the height of five feet in good ground; the flowers are very large, of a deep blue colour, but not many upon each spike. 8. The pyrenaicum, or Pyrenean monkhood, flowers in July. It grows about four feet high, and carries a long spike of yellow flowers. 9. The cammarum, grows about four feet high, and flowers in the beginning of July. 10. The orientale, or eastern monkhood, grows sometimes more than six feet high, and bears a white flower.

Culture. All these species, except the last, are natives of the Alps, the mountains of Germany, Austria, and Tartary; so require a cool shady situation, except the wholesome wolfsbane, which must have an open exposure. They thrive better in a moist than dry soil; but the ground must not be so wet as to have the water standing near their roots in the winter-time. They may all be propagated by sowing their seeds in autumn, upon a north border, where they are screened from the sun. The plants will come up in the spring, when they must be kept clean from weeds during the summer-months; and, in very dry seasons, if they are frequently refreshed with water, their growth will be greatly promoted. The following autumn they should be transplanted into shady borders, in rows a foot asunder, and the plants six inches distant from one another. In this situation they may remain two years, when they will carry flowers, and so may be transplanted to those

places where they are to remain. The eastern monkhood is a native of the Levant, from whence the seeds of it were first sent by Dr Tournefort to the royal garden at Paris, from whence some other gardens have been furnished with the seeds. It is very rare in Europe at present.

Qualities. All these species of plants are poisonous, except the anthora, which has been said to be an antidote to the rest. This, however, rests on the single authority of Matthioli; from whom others have implicitly and confidently copied this particular: but till the efficacy of this antidote is established by repeated trials, made by experienced physicians, we apprehend it ought not to be mentioned; as the mentioning an antidote of this kind may occasion the neglect of other more powerful remedies. Of the effects of this, however, and other vegetable poisons, medical writers give but a confused account. In general, those which are not of the narcotic kind, nor excite violent vomitings and purgings, produce their pernicious effects by irritating the nervous coats of the stomach and intestines, so as to occasion violent convulsions, not only in them, but through the whole body. The proper cure is evacuation by vomit: but this is not to be obtained without some difficulty; because there is usually such a contraction about the upper orifice of the stomach, that nothing can either be swallowed or thrown up. In this case, an infusion of tobacco has been recommended, and may probably be of service: for being itself of a very stimulating nature, it may for a moment take off the violent spasms occasioned by the poison; in which case, a violent vomiting will immediately ensue.—The stomach being thoroughly emptied, and deglutition rendered easy, the cure may be completed by oily and mucilaginous medicines. On account of the poisonous qualities of monkhood, no species of it should be planted where children have access, lest they should suffer by putting the leaves or flowers in their mouths, or rubbing them about their eyes; for the juice of the leaves will occasion great disorder by being only rubbed upon very tender flesh; and the saliva of the flowers, when blown into the eyes, causes them to swell greatly.

ACONITUM *Hyemale*. See HELLERBORUS.

ACONTIAS, in zoology, an obsolete name of the anguis jaculus, or dart-snake, belonging to the order of amphibia serpentes. See ANGUIS.

ACONTIUM, *aconitifolius*, in Grecian antiquity, a kind of dart or javelin, resembling the Roman pilum.

ACONTIUS (James), a philosopher, civilian, and divine, born at Trent in the 16th century: he embraced the reformed religion; and, coming into England in the reign of queen Elizabeth, was much honoured by her, which he acknowledges in a book dedicated to that queen. This work is his celebrated Collection of the Stratagems of Satan, which has been so often translated, and borne so many editions.

ACORN, the fruit of the oak-tree. See QUERCUS.

ACORN, (in sea-language,) a little ornamental piece of wood, fashioned like a cone, and fixed on the uppermost point of the spindle, above the vane, on the mast-head. It is used to keep the vane from being blown off from the spindle in a whirlwind, or when the ship leans much to one side under sail.

ACORUS, CALAMUS AROMATICUS, SWEET FLAG, or SWEET RUSH; a genus of the monogynia order, belonging

¹ Acorus,
or
Sweet Flag

longing to the hexandria class of plants, of which only one species is known. It grows naturally in shallow standing waters, and is found wild in some parts of Britain. The leaves are sometimes two feet long, narrow, compressed, smooth, and of a bright green, terminating in a point; the root is pretty long, of a whitish, reddish, and partly greenish colour. Among the leaves there arises a single one, thicker and more robust than the rest, furrowed on the surface, and of a paler green. On this grow frequently two spikes of flowers, by many writers called *juli*. These are of a brown colour, having a chequered surface. The root of this plant has a very agreeable flavour, which is greatly improved by drying. It is reckoned carminative and stomachic, having a warm, pungent, bitterish taste; so is frequently used as an ingredient in bitters *. It has been complained of, however, as communicating a nauseous flavour to those bitters in which it was infused; and Neumann observes, that its agreeable flavour, as well as its distinguishing taste, reside entirely in a volatile essential oil; the residuum after distillation having a nauseous flavour, not at all resembling that of the calamus.—The Turks candy the roots, and imagine them a preservative against contagion. They are usually imported from the Levant into Britain; though those of our own country might answer equally well. Neither horses, cows, goats, sheep, or swine, will eat the herb, or its roots.

* See *Materia Medica*, n^o 194.

Culture. The acorus being a perennial plant, may be transplanted into a garden, where it will thrive very well if the ground is moist; but never flowers unless it grows in water. It loves an open situation, and will not thrive well under the shade of trees. The flowers appear the latter end of June, and continue till August.

ACORUS, in the materia medica, a name sometimes given to the great galangal *.

ACOUSMATICI, sometimes also called *Acoustici*, in Grecian antiquity, such of the disciples of Pythagoras as had not completed their five years probation.

ACOUSTIC, in general, denotes any thing that relates to the ear, the sense of hearing, or the doctrine of sounds.

ACUSTIC Duct, in anatomy, the same with meatus auditorius, or the external passage of the ear *.

ACUSTIC Instrument, or auricular tube. See ACUSTICS, n^o 26.

ACUSTIC Vessel, in the ancient theatres, were a kind of vessels, made of brass, shaped in the bell fashion, which being of all tones within the pitch of the voice, or even of instruments, rendered the sounds more audible, so that the actors could be heard through all parts of theatres, which were even 400 feet in diameter.

ACUSTIC Disciples, among the ancient Pythagoreans, those more commonly called *Acousmatici*.

The Science of

ACORUS.
||
Acoustics.

* See *Gallegual*; and *Mat. Med.* n^o 194.

* See *Anatomy*, n^o 405, b.

A C O U S T I C S

¹ INSTRUCTS us in the nature of sound. It is divided by some writers into *Diacoustics*, which explains the properties of those sounds that come directly from the sonorous body to the ear; and *Catacoustics*, which treats of reflected sounds: but such distinction does not appear to be of any real utility.

² Catacoustics

CHAP. I. Different Theories of Sound.

³ Most sounds, we all know, are conveyed to us on the bosom of the air. In whatever manner they either float upon it, or are propelled forward in it, certain it is, that, without the vehicle of this or some other fluid, we should have no sounds at all. Let the air be exhausted from a receiver, and a bell shall emit no sound when rung in the void; for, as the air continues to grow less dense, the sound dies away in proportion, so that at last its strongest vibrations are almost totally silent.

⁴ Thus air is a vehicle for sound. However, we must not, with some philosophers, assert, that it is the only vehicle; that, if there were no air, we should have no sounds whatsoever: for it is found by trial, that sounds are conveyed through water almost with the same facility with which they move through air. A bell rung in water returns a tone as distinct as if rung in our aerial atmosphere. This was observed by Derham, who also remarked that the tone came a quarter deeper. Some naturalists assure us also, that fishes have a strong perception of sounds, even at the bottom of deep rivers (A). From hence, it would seem not to be very material in the propagation of sounds, whether the

Of the vehicles of sound

fluid which conveys them be elastic or otherwise. Water, which, of all substances that we know, has the least elasticity, yet serves to carry them forward; and if we make allowance for the difference of its density, perhaps the sounds move in it with a proportional rapidity to what they are found to do in the elastic fluid of air.

One thing however is certain, that whether the fluid which conveys the note be elastic or non-elastic, whatever sound we hear is produced by a stroke, which the sounding body makes against the fluid, whether air or water. The fluid being struck upon, carries the impression forward to the ear, and there produces its sensation. Philosophers are so far agreed, that they all allow that sound is nothing more than the impression made by an elastic body upon the air or water, and this impression carried along by either fluid to the organ of hearing. But the manner in which this conveyance is made, is still disputed: Whether the sound is diffused into the air, in circle beyond circle, like the waves of water when we disturb the smoothness of its surface by dropping in a stone; or whether it travels along, like rays diffused from a center, somewhat in the swift manner that electricity runs along a rod of iron; these are the questions which at present divide the learned.

Newton was of the first opinion. He has explained the progression of sound by an undulatory, or rather a vermicular, motion in the parts of the air. If we have an exact idea of the crawling of some insects, we shall have a tolerable notion of the progression of sound upon this hypothesis. The insect, for instance, in its motion, first carries its contractions from the hinder part, in order

⁵ What sound is, and how propagated.

⁶ Newton's theory.

(A) Others, however, deny this; asserting, that fishes are totally deaf. Nor have anatomists, from examining their organs of hearing, been able to pronounce with certainty upon the matter. See FISH; and COMPARATIVE Anatomy, n^o 175.

Different Theories of Sound.

Plate III.
fig. 1.

* See *Elasticity*.

der to throw its fore part to the proper distance, then it carries its contractions from the fore part to the hinder to bring that forward. Something similar to this is the motion of the air when struck upon by a sounding body. To be a little more precise, suppose ABC, the string of an harpichord screwed to a proper pitch, and drawn out of the right line by the finger at B. We have elsewhere observed*, that such a string would, if let go, vibrate to E; and from E to D, and back again. We observed, that it would continue thus to vibrate like a pendulum for ever, if not externally resisted, and, like a pendulum, all its little vibrations would be performed in equal times, the last and the first being equally long in performing. We shewed also, that, like a pendulum, its greatest swiftness would always be when it arrived at E, the middle part of its motion. Now then, if this string be supposed to fly from the finger at B, it is obvious, that whatever be its own motion, such also will be the motion of the parts of air that fly before it. Its motion, as is obvious, is first uniformly accelerated forward from B to E, then retarded as it goes from E to D, accelerated back again as it returns from D to E, and retarded from E to B. This motion being therefore sent in succession through a range of elastic air, it must happen, that the parts of one range of air must be sent forward with accelerated motion, and then with a retarded motion. This accelerated motion reaching the remotest end of the first range will be communicated to a second range, while the nearest parts of the first range being retarded in their motion, and falling back with the recession of the string, retire first with an accelerated, then with a retarded motion, and the remotest parts will soon follow. In the mean time, while the parts of the first range are thus falling back, the parts of the second range are going forward with an accelerated motion. Thus there will be an alternate condensation and relaxation of the air, during the time of one vibration; and as the air going forward strikes any opposing body with greater force than upon retiring, so each of these accelerated progressions have been called by Newton a *pulse* of sound.

Thus will the air be driven forward in the direction of the string. But now we must observe, that these pulses will move every way; for all motion impressed upon fluids in any direction whatsoever, operates all around in a sphere: so that sounds will be driven in all directions.

NOTE on N^o 5th. *preceding page*.] Though air and water are both vehicles of sound, yet neither of them seem to be so by themselves, but only as they contain an exceedingly subtle fluid capable of penetrating the most solid bodies. Hence, by the medium of that fluid, sounds can be propagated through wood, or metals, even more readily than through the open air. By the same means, deaf people may be made sensible of sounds, if they hold a piece of metal in their mouth, one end of which is applied to the sounding body. As it is certain, therefore, that air cannot penetrate metals, we must acknowledge the medium of sound to be of a more subtle nature; and thus the electrical fluid will naturally occur as the proper one. But why then is sound no longer heard in an exhausted receiver, if the air is not the fluid by which it is conveyed, seeing the electrical matter cannot be excluded? The reply to this is obvious: The electrical fluid is so exceedingly subtle, and pervades solid bodies with so much ease, that any motion of a solid body in a quantity of electric matter by itself, can never excite a degree of agitation in it sufficient for producing a sound; but if the electric fluid is entangled among the particles of air, water, wood, metal, &c. whatever affects their particles will also affect this fluid, and produce an audible noise. In the experiment of the air-pump, however, there may be an ambiguity, as the gradual exhausting of the air creates an increasing difference of pressure on the outside, and may occasion in the glass a difficulty of vibrating, so as to render it less fit to communicate to the air without the vibrations that strike it from within. From this cause the diminution of sound in an exhausted receiver may be supposed to proceed, as well as from the diminution of the air. But if any internal agitation of its parts should happen to the electrical fluid, exceeding loud noises might be propagated through it, as has been the case when large meteors have kindled at a great distance from the earth. Of this an instance is recorded in the Philosophical Transactions by Dr Halley. (See FIRE). It is also difficult to account for the exceeding great swiftness of sound, upon the supposition that it is propagated by means of air alone; for nothing is more certain, than that the strongest and most violent gale is, in its course, inert and sluggish, compared with the motion of sound.

tions, backwards, forwards, upwards, downwards, and on every side. They will go on succeeding each other, one on the outside of the other, like circles in disturbed water; or rather, they will lie one without the other, in concentric shells, shell above shell, as we see in the coats of an onion.

All who have remarked the tone of a bell, while its sounds are decaying away, must have an idea of the pulses of sound, which, according to Newton, are formed by the air's alternate progression and recession. And it must be observed, that as each of these pulses are formed by a single vibration of the string, they must be equal to each other; for the vibrations of the string are known to be so.

Again, as to the velocity with which sounds travel, this Newton determines, by the most difficult calculation that can be imagined, to be in proportion to the thickness of the parts of the air, and the distance of these parts from each other. From hence he goes on to prove, that each little part moves backward and forward like a pendulum; and from thence he proceeds to demonstrate, that if the atmosphere were of the same density every where as at the surface of the earth, in such a case, a pendulum, that reached from its highest surface down to the surface of the earth, would by its vibrations discover to us the proportion of the velocity with which sounds travel. The velocity with which each pulse would move, he shews, would be as much greater than the velocity of such a pendulum swinging with one complete vibration, as the circumference of a circle is greater than the diameter. From hence he calculates, that the motion of sound would be 979 feet in one second. But this not being consonant to experience, he takes in another consideration, which destroys entirely the rigour of his former demonstration, namely, vapours in the air; and then finds the motion of sound to be 1142 feet in one second, or near 13 miles in a minute: a proportion which experience had established nearly before.

Thus much will serve to give an obscure idea of a most obscure theory; a theory which has met with numbers of opposers. Even John Bernoulli, Newton's greatest disciple, modestly owns that he did not pretend to understand this part of the *Principia*. He attempted therefore to give a more perspicuous demonstration of his own, that might confirm and illustrate the

Different Theories of Sound.

Preceding Theory opposed.

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the Newtonian theory. The subject seemed to reject elucidation: his theory is obviously wrong, as D'Alembert has proved in his Theory of Fluids. Euler, therefore, rejecting the Newtonian doctrine entirely, has attempted to establish another; but as he has hitherto only given the result of his calculations, without the progressive proofs that confirm his opinion, the learned continue in suspense as to the merit of his work.

The objec-
tions.

Various have been the objections that have been made to the Newtonian system of sounds. First, it is urged, that if the first pulse of sound be driven by that which immediately follows, and that by the succeeding, and so on, it must then happen, that the more numerous the pulses, the farther will the sound be driven; so that a string which vibrates the longest will be heard at the greatest distance, which is contrary to known experience. Again, it is urged, that this theory can only agree with the motion of sound in an elastic fluid, whereas sounds are known to move forward through water that is not elastic. To explain their progress therefore through water, a second theory must be formed: so that two theories must be made to explain a similar effect; which is contrary to the simplicity of true philosophy, for it is contrary to the simplicity of nature. It is still farther urged, that this slow vermicular motion but ill represents the velocity with which sounds travel, as we know by experience that it is almost 13 miles in a minute. In short, it is urged, that such undulations as have been described, when coming from several sonorous bodies at once, would cross, obstruct, and confound each other; so that, if they were conveyed to the ear by this means, we should hear nothing but a medley of discord and broken articulations. But this is equally with the rest contradictory to experience, since we hear the fullest concert, not only without confusion, but with the highest pleasure. These objections, whether well founded or not, have given rise to another theory: which we shall likewise lay before the reader; though it too appears liable to objections, which shall be afterwards mentioned.

Another
Theory.

Every sound may be considered as driven off from the sounding body in straight lines, and impressed upon the air in one direction only; but whatever impression is made upon a fluid in one direction, is diffused upon its surface into all directions: so that the sound first driven directly forward soon fills up a wide sphere, and is heard on every side. Thus, as it is impressed, it instantaneously travels forward with a very swift motion, resembling the velocity with which we know electricity flies from one end of a line to another.

Now, as to the pulses, or open shakes as the musicians express it, which a sounding body is known to make, each pulse (say the supporters of this theory) is itself a distinct and perfect sound, and the interval between every two pulses is profoundly silent. Continuity of sound from the same body is only a deception of the hearing; for as each distinct sound succeeds at very small intervals, the organ has no time to transmit its images with equal swiftness to the mind, and the interval is thus lost to sense: just as in seeing a flaming torch, if flared round in a circle, it appears as a ring of fire. In this manner a beaten drum, at some small distance, presents us with the idea of continuing sound. When children run with their sticks along a rail, a continuing sound is thus represented,

though it need scarce be observed, that the stroke against each rail is perfectly distinct and insulated.

According to this theory, therefore, the pulses are nothing more than distinct sounds repeated by the same body, the first stroke or vibration being ever the loudest, and travelling farther than those that follow; while each succeeding vibration gives a new sound, but with diminished force, till at last the pulses decay away totally, as the force decays that gives them existence.

All bodies whatsoever that are struck, return more or less a sound: but some, wanting elasticity, give back no repetition of the sound; the noise is at once begotten and dies: while other bodies, however, there are, which being more elastic, and whose parts are capable of vibration, give back a sound, and repeat the same several times successively. These last are said to have a tone; the others are not allowed to have any.

This tone of the elastic string, or bell, is notwithstanding nothing more than a similar sound of what the former bodies produced, but with the difference of being many times repeated, while their note is but single. So that, if we would give the former bodies a tone, it will be necessary to make them repeat their sound, by repeating our blows swiftly upon them. This will effectually give them a tone, and even an unmusical instrument has often had a fine effect by its tone in our concerts.

Let us now go on then to suppose, that by swift and equally continued strokes we give any non-elastic body its tone, it is very obvious, that no alterations will be made in this tone by the quickness of the strokes, though repeated ever so fast. There will only render the tone more equal and continuous, but make no alteration in the tone it gives. On the contrary, if we make an alteration in the force of each blow, a different tone will then undoubtedly be excited. The difference will be small, it must be confessed; for the tones of these inflexible bodies are capable but of small variation; however, there will certainly be a difference. The table on which we write, for instance, will return a different sound when struck with a club, from what it did when struck only with a switch. Thus non-elastic bodies return a difference of tone, not in proportion to the swiftness with which their sound is repeated, but in proportion to the greatness of the blow which produced it; for in two equal non-elastic bodies, that body produced the deepest tone that was struck by the greatest blow.

We now then come to a critical question, What is it that produces the difference of tone in two elastic sounding bells or strings? Or what makes one deep and the other shrill? This question has always been hitherto answered by saying, that the depth or height of the note proceeded from the slowness and swiftness of the times of the vibrations. The slowest vibrations, it has been said, are qualified for producing the deepest tones, while the swiftest vibrations produce the highest tones. In this case, an effect has been given for a cause. It is in fact the force with which the sounding string strikes the air when struck upon, that makes the true distinction in the tones of sounds. It is this force, with greater or less impressions, resembling the greater or less force of the blows upon a non-elastic body, which produces correspondent affections of sound. The greatest forces produce the deepest sounds: the high notes are the effect of small efforts. In the same manner a bell, wide
at

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at the mouth, gives a grave sound; but if it be very maffy withal, that will render it still graver; but if maffy, wide, and long or high, that will make the tone deepeft of all.

Thus, then, will elastic bodies give the deepeft found, in proportion to the force with which they strike the air: but if we should attempt to increafe their force by giving them a stronger blow, this will be in vain; they will still return the fame tone; for fuch is their formation, that they are fonorous only becaufe they are elastic, and the force of this elasticity is not increafed by our strength, as the greatnefs of a pendulum's vibration will not be increafed by falling from a greater height.

Thus far of the lengths of cords. Now as to the frequency with which they vibrate the deepeft tones, it has been found, from the nature of elastic strings, that the longeft strings have the wideft vibrations, and confequently go backward and forward floweft; while, on the contrary, the fhorteft strings vibrate the quickeft, or come and go in the fhorteft intervals. From hence thofe who have treated of founds, have afferted, as was faid before, that the tone of the ftring depended upon the length or the fhortnefs of the vibrations. This, however, is not the cafe. One and the fame ftring, when ftruck, muft always, like the fame pendulum, return precifely fimilar vibrations; but it is well known, that one and the fame ftring, when ftruck upon, does not always return precifely the fame tone: fo that in this cafe the vibrations follow one rule, and the tone another. The vibrations muft be invariably the fame in the fame ftring, which does not return the fame tone invariably, as is well known to muficians in general. In the violin, for instance, they can eafily alter the tone of the ftring an octave or eight notes higher, by a foffer method of drawing the bow; and fome are known thus to bring out the moft charming airs imaginable. Thefe peculiar tones are by the Englifh fiddlers called *flutenotes*. The only reafon that can be affigned for the fame ftring thus returning different tones, muft certainly be the different force of its ftrokes upon the air. In one cafe, it has double the tone of the other; becaufe upon the foft touches of the bow, only half its elasticity is put into vibration.

This being understood (continue the authors of this theory) we fhall be able clearly to account for many things relating to founds that have hitherto been inexplicable. Thus, for instance, if it be asked, When two ftrings are ftretched together of equal lengths, tenfion, and thicknefs, how does it happen, that one of them being ftruck, and made to vibrate throughout, the other fhall vibrate throughout alfo? the answer is obvious: The force that the ftring ftruck receives is communicated to the air, and the air communicates the fame to the fimilar ftring; which therefore receives all the force of the former; and the force being equal, the vibrations muft be fo too. Again, put the queftion, If one ftring be but half the length of the other, and be ftruck, how will the vibrations be? The answer is, The longeft ftring will receive all the force of the ftring half as long as itfelf, and therefore it will vibrate in proportion, that is, through half its length. In the fame manner, if the longeft ftring were three times as long as the

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other, it would only vibrate in a third of its length; or if four times, in a fourth of its length. In fhort, whatever force the fmaller ftring impreffes upon the air, the air will impreff a fimilar force upon the longer ftring, and partially excite its vibrations.

From hence alfo we may account for the caufe of thofe charming, melancholy gradations of found in the Eolian lyre; an instrument (fays Sir John Hawkins) lately obtruded upon the public as a new invention, tho' defcribed above a century ago by Kircher *. This instrument is eafily made, being nothing more than a long narrow box of thin deal, about 30 inches long, 5 inches broad, and 1½ inches deep, with a circle in the middle of the upper fide or belly about 1½ inch diameter, pierced with fmall holes. On this fide are feven, ten, or (according to Kircher) fifteen or more ftrings of very fine gut, ftretched over bridges at each end, like the bridge of a fiddle, and fcrewed up or relaxed with fcrew-pins (z). The ftrings are all tuned to one and the fame note; and the instrument is placed in fome current of air, where the wind can bruft over its ftrings with freedom. A window with the fafh juft raifed to give the air admiffion, will anfwer this purpofe exactly. Now when the entering air blows upon thefe ftrings with different degrees of force, there will be excited different tones of found; fometimes the blaft brings out all the tones in full concert; fometimes it finks them to the foftelt murmurs; it feels for every tone, and by its gradations of ftrength follicit thofe gradations of found which art has taken different methods to produce.

We come now, in the laft place, to confider (by this theory) the loudnefs and lownefs, or, as the muficians fpeak, the ftrength and foftnefs, of founds. In vibrating elastic ftrings, the loudnefs of the tone is in proportion to the deepefs of the note; that is, in two ftrings, all things in other circumftances alike, the deepeft tone will be loudelt. In mufical instruments upon a different principle, as in the violin, it is otherwife; the tones are made in fuch instruments, by a number of fmall vibrations crowded into one ftroke. The refined bow, for instance, being drawn along a ftring, its roughnefs catches the ftring at very fmall intervals, and excite its vibrations. In this instrument, therefore, to excite loud tones, the bow muft be drawn quick, and this will produce the greateft number of vibrations. But it muft be obferved, that the more quick the bow paffes over the ftring, the lefs apt will the roughnefs of its furface be to touch the ftring at every infant; to remedy this, therefore, the bow muft be preffed the harder as it is drawn quicker, and thus its fulleft found will be brought from the instrument. If the fwiftnefs of the vibrations in an instrument thus rubbed upon, exceed the force of the deeper found in another, then the fwift vibrations will be heard at a greater diftance, and as much farther off as the fwiftnefs in them exceeds the force in the other.

By the fame theory (it is alleged) may all the phenomena of mufical founds be eafily explained.—The fables of the ancients pretend, that mufic was firft found out by the beating of different hammers upon the fmith's anvil. Without purfuing the fable, let us endeavour to explain the nature of mufical founds by a fimilar method.

H 2

thod.

(z) The figure represents the instrument with ten chords; of which fome direct only eight to be tuned unisons, and the two outermost octaves below them. But this seems not to be material.

¹⁰ Eolian Lyre. See Placell. fig. 2.

* Vide Kircheri Murgia, lib. ix.

¹¹ The nature of Musical Sounds illustrated according to the fame theory.

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Sounds.

thod. Let us suppose an anvil, or several similar anvils, to be struck upon by several hammers of different weights or forces. The hammer, which is double that of another, upon striking the anvil will produce a sound double that of the other: this double sound musicians have agreed to call an Octave. The ear can judge of the difference or resemblance of these sounds with great ease, the numbers being as one and two, and therefore very readily compared. Suppose that a hammer three times less than the first, strikes the anvil, the sound produced by this will be three times less than the first: so that the ear, in judging the similitude of these sounds, will find somewhat more difficulty; because it is not so easy to tell how often one is contained in three, as it is to tell how often it is contained in two. Again, suppose that a hammer four times less than the first strikes the anvil, the ear will find greater difficulty still in judging precisely the difference of the sounds; for the difference of the numbers four and one cannot so soon be determined with precision as three and one. If the hammer be five times less, the difficulty of judging will be still greater. If the hammer be six times less, the difficulty still increases, and so also of the seventh, inasmuch that the ear cannot always readily and at once determine the precise gradation. Now, of all comparisons, those which the mind makes most easily, and with least labour, are the most pleasing. There is a certain regularity in the human soul, by which it finds happiness in exact and striking and easily-made comparisons. As the ear is but an instrument of the mind, it is therefore most pleased with the combination of any two sounds, the differences of which it can most readily distinguish. It is more pleased with the concord of two sounds which are to each other as one and two, than of two sounds which are as one and three, or one and four, or one and five, or one and six or seven. Upon this pleasure, which the mind takes in comparison, all harmony depends. The variety of sounds is infinite; but because the ear cannot compare two sounds so readily to distinguishing their discriminations when they exceed the proportion of one and seven, musicians have been content to confine all harmony within that compass, and allowed but seven notes in musical composition.

Let us now then suppose a stringed instrument fitted up in the order mentioned above. For instance: Let the first string be twice as long as the second; let the third string be three times shorter than the first, let the fourth be four times, the fifth string five times, and the sixth six times as short as the first. Such an instrument would probably give us a representation of the lyre as it came first from the hand of the inventor. This instrument will give us all the seven notes following each other, in the order in which any two of them will accord together most pleasingly; but yet it will be a very inconvenient and a very disagreeable instrument: inconvenient, for in a compass of seven strings only, the first must be seven times as long as the last; and disagreeable, because this first string will be seven times as loud also; so that when the tones are

to be played in a different order, loud and soft sounds would be intermixed with most disgusting alternations. In order to improve the first instrument, therefore, succeeding musicians very judiciously threw in all the other strings between the two first, or, in other words, between the two Octaves, giving to each, however, the same proportion to what it would have had in the first natural instrument. This made the instrument more portable, and the sounds more even and pleasing. They therefore disposed the sounds between the Octave in their natural order, and gave each its own proportional dimensions. Of these sounds, where the proportion between any two of them is most obvious, the concord between them will be most pleasing. Thus Octaves, which are as two to one, have a most harmonious effect; the fourth and fifth also sound sweetly together, and they will be found, upon calculation, to bear the same proportion to each other that Octaves do. "Let it not be supposed," (says Mr. Saverus) that the musical scale is merely an arbitrary combination of sounds: "it is made up from the consonance and differences of the parts which compose it. Those who have often heard a fourth and a fifth accord together, will be naturally led to discover their difference at once; and the mind unites itself to their beauties." Let us then cease to assign the coincidences of vibrations as the cause of harmony, since these coincidences in two strings vibrating at different intervals, must at best be but fortuitous; whereas concord is always pleasing. The true cause why concord is pleasing, must arise from our power, in such a case, of measuring more easily the differences of the tones. In proportion as the note can be measured with its fundamental tone by large and obvious distinctions, then the concord is most pleasing; on the contrary, when the ear measures the discriminations of two tones by very small parts, or cannot measure them at all, it loses the beauty of their resemblance: the whole is discord and pain (c).

But there is another property in the vibration of a musical string not yet taken notice of, and which is alleged to confirm the foregoing theory. If we strike the string of an harpsichord, or any other elastic sounding chord whatever, it returns a continuing sound. This till of late was considered as one simple uniform tone; but all musicians now confess, that instead of one tone it actually returns four tones, and that constantly. The notes are, beside the fundamental tone, an octave above, a twelfth above, and a seventeenth. One of the bass-notes of an harpsichord has been dissected in this manner by Rameau, and the actual existence of these tones proved beyond a possibility of being controverted. In fact, the experiment is easily tried; for if we smartly strike one of the lower keys of an harpsichord, and then take the finger briskly away, a tolerable ear will be able to distinguish, that, after the fundamental tone has ceased, three other shriller tones will be distinctly heard; first the octave above, then the twelfth, and lastly the seventeenth: the octave above is in general almost mixed with the fundamental tone, so as not to be easily perceived, except by an ear long habituated to the minute discrimi-

(c) It is certain, that in proportion to the simplicity of relations in sound, the ear is pleased with its combinations; but this is not to be admitted as the cause why musicians have confined all harmony to an octave. Discriminated sounds, whose vibrations either never coincide, or at least very rarely, do not only cease to please, but violently grate, the ear. Harmony and discord, therefore, are neither discriminated by the judgment of hearers, nor the institution of musicians, but by their own essential and immutable nature.

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differiminations of sounds. So that we may observe, that the smallest tone is heard last, and the deepest and largest one first: the two others in order.

In the whole theory of sounds, nothing has given greater room for speculation, conjecture, and disappointment, than this amazing property in elastic strings. The whole string is universally acknowledged to be in vibration in all its parts, yet this single vibration returns no less than four different sounds. They who account for the tones of strings by the number of their vibrations are here at the greatest loss. Daniel Bernouilli supposes, that a vibrating string divides itself into a number of curves, each of which has a peculiar vibration; and though they all swing together in the common vibration, yet each vibrates within itself. This opinion, which was supported, as most geometrical speculations are, with the parade of demonstration, was only born soon after to die. Others have ascribed this to an elastic difference in the parts of the air, each of which, at different intervals, thus received different impressions from the string, in proportion to their elasticity. This is absurd. If we allow the difference of tone to proceed from the force, and not the frequency, of the vibrations, this difficulty will admit of an easy solution. These sounds, though they seem to exist together in the string, actually follow each other in succession: while the vibration has greatest force, the fundamental tone is brought forward: the force of the vibration decaying, the octave is produced, but almost only instantaneously; to this succeeds, with diminished force, the twelfth; and, lastly, the seventeenth is heard to vibrate with great distinctness, while the three other tones are always silent. These sounds, thus excited, are all of them the harmonic tones, whose differences from the fundamental tone are, as was said, strong and distinct. On the other hand, the discordant tones cannot be heard. Their differences being but very small, they are overpowered, and in a manner drowned in the tones of superior difference: yet not always neither; for Daniel Bernouilli has been able, from the same stroke, to make the same string bring out its harmonic and its discordant tones also (p.). So that from hence we may justly infer, that every note whatsoever is only a succession of tones; and that those are most distinctly heard, whose differences are most easily perceivable.

32
objections
to the preceding
theory.

To this theory, however, though it has a plausible appearance, there are strong and indeed insuperable objections. The very fundamental principle of it is false. No body whatever, whether elastic or non elastic, yields a graver sound by being struck with a larger instrument, unless either the sounding body, or that part of it which emits the sound, is enlarged. In this case, the largest bodies always return the gravest sounds.

In speaking of elastic and non-elastic bodies in a musical sense, we are not to push the distinction so far as when we speak of them philosophically. A body is *musically* elastic, all of whose parts are thrown into vibrations so as to emit a sound when only part of their surface is struck. Of this kind are bells, musical strings, and all bodies whatever that are considerably hollow.—Musical non-elastics are such bodies as emit a sound only from that particular place which is struck: thus, a table, a plate of iron nailed on wood, a bell hung

in the earth, are all of them non-elastics in a musical sense, though not philosophically so. When a solid body, such as a log of wood, is struck with a twich, only that part of it emits a sound which comes in contact with the twich; the note is acute and loud, but would be no less so though the adjacent parts of the log were removed. If, instead of the twich, a heavier or larger instrument is made use of, a larger portion of its surface then returns a sound, and the note is consequently more grave; but it would not be so, if the large instrument struck with a sharp edge, or a surface only equal to that of the small one.

In sounds of this kind, where there is only a single thwack, without any repetition, the immediate cause of the gravity or acuteness seems to be the quantity of air displaced by the sounding body; a large quantity of air displaced produces a grave sound, and a smaller quantity a more acute one, the force wherewith the air is displaced signifying very little.—What we here advance is confirmed by some experiments made by Dr Priestley, concerning the *musical tone* of electrical discharges. The passage being curious, and not very long, we shall here transcribe it:

“As the course of my experiments has required a great variety of electrical explosions, I could not help observing a great variety in the musical tone made by the reports. This excited my curiosity to attempt to reduce this variation to some measure. Accordingly, by the help of a couple of spinets, and two persons who had good ears for music, I endeavoured to ascertain the tone of some electrical discharges; and observed, that every discharge made several strings, particularly those that were chords to one another, to vibrate: but one note was always predominant, and sounded after the rest. As every explosion was repeated several times, and three of us separately took the same note, there remained no doubt but that the tone we fixed upon was at least very near the true one. The result was as follows.

“A jar containing half a square foot of coated glass sounded F sharp, concert pitch. Another jar of a different form, but equal surface, sounded the same.

“A jar of three square feet sounded C below F sharp. A battery consisting of sixty-four jars, each containing half a square foot, sounded F below the C.

“The same battery, in conjunction with another of thirty-one jars, sounded C sharp. So that a greater quantity of coated glass always gave a deeper note.

“Differences in the degree of a charge in the same jar made little or no difference in the tone of the explosion: if any, a higher charge gave rather a deeper note.

These experiments shew us how much the gravity or acuteness of sounds depend on the quantity of air put in agitation by the sounding body. We know that the noise of the electric explosion arises from the return of the air into the vacuum produced by the electric flash. The larger the vacuum, the deeper was the note: for the same reason, the discharge of a musket produces a more acute note than that of a cannon; and thunder is deeper than either.

Besides this, however, other circumstances concur to produce different degrees of gravity or acuteness in sounds. The sound of a table struck upon with a piece

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of wood, will not be the same with that produced from a plate of iron struck by the same piece of wood, even if the blows should be exactly equal, and the iron perfectly kept from vibrating.—Here the sounds are generally said to differ in their degrees of acuteness, according to the specific gravities or densities of the substances which emit them. Thus gold, which is the most dense of all metals, returns a much graver sound than silver; and metaline wires, which are more dense than therms, return a proportionably graver sound.—But neither does this appear to be a general rule in which we can put confidence. Bell-metal is denser than copper, but it by no means appears to yield a graver sound; on the contrary, it seems very probable, that copper will give a graver sound than bell-metal, if both are struck upon in their non-elastic state; and we can by no means think that a bell of pure tin, the least dense of all the metals, will give a more acute sound than one of bell-metal, which is greatly more dense.—In some bodies hardness seems to have a considerable effect. Glass, which is considerably harder than any metal, gives a more acute sound; bell-metal is harder than gold, lead, or tin, and therefore sounds much more acutely; though how far this holds with regard to different substances, there are not a sufficient number of experiments for us to judge.

In bodies musically elastic, the whole substance vibrates with the slightest stroke, and therefore they always give the same note whether they are struck with a large or with a small instrument; so that striking a part of the surface of any body musically elastic is equivalent, in it, to striking the whole surface of a non-elastic one. If the whole surface of a table was struck with another table, the note produced would be neither more nor less acute whatever force was employed; because the whole surface would then yield a sound, and no force could increase the surface; the sound would indeed be louder in proportion to the force employed, but the gravity would remain the same. In like manner, when a bell, or musical string, is struck, the whole substance vibrates, and a greater stroke cannot increase the substance.—Hence we see the fallacy of what is said concerning the Pythagorean anvils. An anvil is a body musically elastic, and no difference in the tone can be perceived whether it is struck with a large, or with a small hammer; because either of them are sufficient to make the whole substance vibrate, provided nothing but the anvil is struck upon: smiths, however, do not strike their anvils, but red-hot iron laid upon their anvils; and thus the vibrations of the anvil are stopped, so that it becomes a non-elastic body, and the differences of tone in the strokes of different hammers proceed only from the surface of the large hammers covering the whole surface of the iron, or at least a greater part of it than the small ones. If the small hammer is sufficient to cover the whole surface of the iron as well as the large one, the note produced will be the same, whether the large or the small hammer is used.

Lastly, The argument for the preceding theory, grounded on the production of what are called *flute-notes* on the violin, is built on a false foundation; for these notes are not produced by drawing the bow softly on the string, but by lightly touching the string with the finger. In this, case the same sounds are produced as if the vibrations were transferred to the space between

the end of the finger-board and the finger, instead of that between the finger and the bridge. Why this small part of the string should vibrate in such a case, and not that which is under the immediate action of the bow, we must own ourselves ignorant: nor dare we affirm that the vibrations really are transferred in this manner, only the same sounds are produced as if they were.

Though these objections seem sufficiently to overturn the foregoing theory, with regard to acute sounds being the effects of weak strokes, and grave ones of stronger impulses, we can by no means admit that longer or shorter vibrations are the occasion of gravity or acuteness in sounds. A musical sound, however lengthened, either by string or bell, is only a repetition of a single one, whose duration by itself is but for a moment, and is therefore termed *inappreciable*, like the smack of a whip, or the explosion of an electrical battery. The continuation of the sound is nothing more than a repetition of this instantaneous inappreciable noise after the manner of an echo, and it is only this echo that makes the sound agreeable. For this reason, music is much more agreeable when played in a large hall where the sound is reverberated, than in a small room where there is no such reverberation. For the same reason, the sound of a string is more agreeable when put on a hollow violin than when fastened to a plain board, &c.—In the sound of a bell, we cannot avoid observing this echo very distinctly. The sound appears to be made up of distinct pulses, or repetitions of the same note produced by the stroke of the hammer. It can by no means be allowed, that the note would be more acute though these pulses were to succeed one another more rapidly; the sound would indeed become more simple, but would still preserve the same tone.—In musical strings the reverberations are vastly more quick than in bells; and therefore their sound is more uniform or simple, and consequently more agreeable than that of bells. In musical glasses *, the vibrations must be inconceivably quicker than in any bell, or stringed instrument; and hence they are of all others the most simple and the most agreeable, though neither the most acute nor the loudest.—As far as we can judge, quickness of vibration contributes to the uniformity, or simplicity, but not to the acuteness, nor to the loudness, of a musical note.

It may here be objected, that each of the different pulses, of which we observe the sound of a bell to be composed, is of a very perceptible length, and far from being instantaneous; so that it is not fair to infer what we have done, namely, that the sound of a bell is only a repetition of a single instantaneous stroke, seeing it is evidently the repetition of a lengthened note.—To this we reply, that the inappreciable sound which is produced by striking a bell in a non-elastic state, is the very same which, being first propagated round the bell, forms one of these short pulses that is afterwards re-echoed as long as the vibrations of the metal continue, and it is impossible that the quickness of repetition of any sound can either increase or diminish its gravity.

With regard to the production of the different tones from the bass-string of an harpsichord, we can only offer a conjecture, which is, that as the strings of musical instruments are fastened at both ends, and very tense, the vibrations of the middle parts must be performed much more easily than those towards the ex-

Musical
Sounds.* See
Harmosica.

tremities; .

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tremities; consequently, as vibration must have a certain degree of strength before a sound is produced, the middle parts of the string may vibrate so as to produce a sound, while the extremities have lost that power. This will be equivalent to shortening the string, and consequently the tone must gradually grow more acute.

CHAP. II. Of the Velocity, &c. of Sound. Axioms.

velocity of sound.

HOWEVER it may be with regard to the theories of sound, (which we leave to the judgment of our readers), experience has taught us, that it travels at about the rate of 1142 feet in a second, or near 13 miles in a minute; nor do any obstacles hinder its progress, a contrary wind only a small matter diminishing its velocity.

progress calculated.

The method of calculating its progress is easily made known. When a gun is discharged at a distance, we see the fire long before we hear the sound. If then we know the distance of the place, and know the time of the interval between our first seeing the fire and then hearing the report, this will shew us exactly the time the sound has been travelling to us. For instance, if the gun is discharged a mile off, the moment the flash is seen, you take a watch and count the seconds till you hear the sound; the number of seconds is the time the sound has been travelling a mile.—Again, by the above axiom, we are enabled to find the distance between objects that would be otherwise immeasurable. For example, suppose you see the flash of a gun in the night at sea, and tell seven seconds before you hear the report, it follows therefore, that the distance is seven times 1142 feet, that is, 24 yards more than a mile and a half. In like manner, if you observe the number of seconds between the lightning and the report of the thunder, you know the distance of the cloud from whence it proceeds.

distances calculated means of sound.

Derham has proved by experience, that all sounds whatever travel at the same rate. The sound of a gun, and the striking of a hammer, are equally swift in their motions; the softest whisper flies as swiftly, as far as it goes, as the loudest thunder.

To these axioms we may add the following.

smooth and clear sounds proceed from bodies that are homogeneous, and of a uniform figure; and harsh or obtuse sounds, from such as are of a mixed matter and irregular figure.

Smooth and clear sounds proceed from bodies that are homogeneous, and of a uniform figure; and harsh or obtuse sounds, from such as are of a mixed matter and irregular figure.

velocity of sound is to that of a brisk wind as fifty to one.

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strength of sounds is greatest in cold and dense air, and least in that which is warm and rarefied.

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in all sounds, the angle of incidence is equal to that of reflection; that is, if a line be drawn perpendicular to the reflecting surface, the point from which the sound issues, and that to which it is reflected, will be equally distant from the perpendicular line.

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CHAP. III. Of Reverberated Sounds.

Sound, like light, after it has been reflected from several places, may be collected in one point, as into a focus; and it will be there more audible than in any other part, even than at the place from whence it proceeded. On this principle it is that a whispering gallery is constructed.

SOUND, like light, after it has been reflected from several places, may be collected in one point, as into a focus; and it will be there more audible than in any other part, even than at the place from whence it proceeded. On this principle it is that a whispering gallery is constructed.

The form of this gallery must be that of a concave hemisphere (E), as ABC; and if a low sound or whisper be uttered at A, the vibrations expanding themselves

The form of this gallery must be that of a concave hemisphere (E), as ABC; and if a low sound or whisper be uttered at A, the vibrations expanding themselves

every way will impinge on the points DDD, &c. and from thence be reflected to EEE, and from thence to the points F and G, till at last they all meet in C, where, as we have said, the sound will the most distinctly heard.

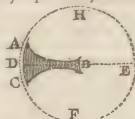
Reverberated Sounds.

Upon this principle also it is that the speaking trumpet is formed. For the sound, in passing through the long and narrow part of the tube, is continually reflected from its curved side into the axis, and by that means is prevented from spreading till at its exit from the tube, whereby the strength of the sound is greatly increased. To the augmentation of the sound, the condensation of the air in the tube (by n^o 19.) likewise contributes.

speaking-trumpet.

But to illustrate this more particularly: Let ABC be the tube, BD the axis, and B the mouth-piece for conveying the voice to the tube. Then it is evident, when a person speaks at B in the trumpet, the whole force of his voice is spent upon the air contained in the tube, which will be agitated through the whole length of the tube; and, by various reflections from the side of the tube to the axis, the air along the middle part of the tube will be greatly condensed, and its *momentum* proportionably increased, so that when it comes to agitate the air at the orifice of the tube AC, its force will be as much greater than what it would have been without the tube, as the surface of a sphere, whose radius is equal to the length of the tube, is greater than the surface of the segment of such a sphere whose base is the orifice of the tube. For a person speaking at B, without the tube, will have the force of his voice spent in exciting concentric superficies of air all around the point B; and when those superficies or pulses of air are diffused as far as D every way, it is plain the force of the voice will there be diffused through the whole superficies of a sphere whose radius is BD; but in the trumpet it will be so confined, that at its exit it will be diffused through so much of that spherical surface of air as corresponds to the orifice of the tube. But since the force is given, its intensity will be always inversely as the number of particles it has to move; and therefore in the tube it will be to that without, as the superficies of such a sphere to the area of the large end of the tube nearly.—To make this matter yet plainer by calculation: Let BD = 5 feet, then will the diameter of the sphere DE = 10 feet, the square of which is 100, which multiplied by 0.7854, gives 78.54 square feet for the area of a great circle BHEFC; and therefore four times that area, viz. 4 × 78.54 = 314.16 = square feet in the superficies of the aerial sphere. If now the diameter AC of the end of a trumpet be one foot, its area will be 0.7854; but, 78.54 : 314.16 :: 1 : 400; therefore the air at the distance of BD will be agitated, by means of the trumpet, with a force 400 times greater than by the voice alone.—It must, however, be observed, that the more sonorous and audible the voice is made by this means, the less articulate or distinct it is: just as light, to which sound bears in many things a pretty near resemblance, the more it is diffused, the less will it distinguish the objects whereon it falls; and the more it is condensed, the brighter and more distinct will the objects it is thrown on always appear.

Fig. 4.



(E) A cylindric or elliptic arch will answer still better than one that is circular.

For

Reverberated Sounds.

21 & 26
Articular Tube.



For a contrary reason, the auricular tube, here represented, affords such as are hard of hearing, when not occasioned by the humours becoming inspissated by cold, &c. and the obstructions consequent thereon: in which case, this machine can be of little service; washing out the wax does much better. But when the organ itself is by age enfeebled and decayed, that is, when the acoustic as well as other nerves have lost their delicacy, this tube may be of real use and service in rendering sounds more distinct and audible.—This machine then seems to be just the reverse of the stentorophonic tube, or the speaking-trumpet just mentioned; as the use of that is to dissipate, this is intended to collect, the rays of sound. With regard to the structure of it, the base is best made in form of the parabolic curve, finishing at top with a small bent tube, that it may more conveniently be applied to the ear. It does thus in some measure resemble the auditory duct, or the inner ear itself, which is also something conical, having the base outward, and the apex next the head; that so a larger quantity of the moved air may be collected, received, and thereby transmitted to the point of the auditory nerve, which must be shaken to produce hearing and give this kind of perception. So that this contrivance is in effect no more than the base of the ear enlarged, and therefore capable of intercepting more of the rays of sound than the ear alone, and that in proportion to its base; and these being gradually contracted into the smaller end, are thence thrown upon the tympanum, and affect the inner ear according to the force and quantity of the impression received. The smoothness of these machines is no small advantage to the conveyance of sounds through them; for by experiment we know, that these always glide with most ease, and move the farthest, over smooth surfaces, where there is nothing to obstruct and divert their progress, or to occasion a rebound.

27
Echoes.

An echo is a reflection of sound striking against some object, as an image is reflected in a glass: but it has been disputed what are the proper qualities in a body for thus reflecting sounds. It is in general known, that caverns, grottoes, mountains, and ruined buildings, return this image of sound. Image we may call it, for in every respect it resembles the image of a visible object reflected from a polished surface. Our figures are often represented in a mirror, without seeing them ourselves, while those standing on one side are alone sensible of the reflection. To be capable of seeing the reflected image of ourselves, we must be directly in a line with the image. Just so it is in an echo; we must stand in the line in which the sound is reflected, or the repetition will be lost to us, while it may, at the same time, be distinctly heard by others who stand at a small distance to one side of us. We have heard of a very extraordinary echo, at a ruined fortress near Louvain, in

Flanders. If a person sung, he only heard his own voice, without any repetition: on the contrary, those who stood at some distance, heard the echo but not the voice; but then they heard it with surprising variations, sometimes louder, sometimes softer, now more near, then more distant. There is an account in the memoirs of the French academy, of a similar echo near Rouen.

As (by n° 20) the angle of reflected sound is equal to that of its incidence, if we know the point from which any sound proceeds, and the place from which it is reflected, we may easily find the point in which its echo will be heard. To hear the echo of one syllable, we must be at the distance of 120 feet from the reflecting surface; for two syllables, 240 feet; for three syllables, 360 feet, &c. For when we speak distinctly, we scarce pronounce more than three syllables, or three and a half, in a second; and as (by n° 13,) sound goes 1142 feet in a second, if the distance between the speaker and the reflecting surface were less than 360 feet, the first syllable would be returned before the last was pronounced (F), and therefore the echo could not be distinctly heard. The echo in Woodstock Park is said to return 17 syllables in the day, and 20 in the night; for then the air being colder and denser, (by n° 19) the strength of the sound must be greater. From hence we may determine, nearly, the distance of an object that is inaccessible; for if an echo of 10 syllables be reflected from the side of a church or tower, it follows, from what has been said, that the object must be 1200 feet distant.

The same sound may have several echoes, if there be several reflecting surfaces so disposed as to make it reverberate to the same point. Thus a violin, or other instrument, when founded in a room where there are several arches of the same form, will sound like a number of violins of the same size playing in concert: or if the arches be of different forms, there will seem to be different instruments playing the same tune.

We shall dismiss this article with a few inventions founded on some of the preceding principles, which may amuse a number of our readers.

Entertaining Experiments and Contrivances.

PLACE a concave mirror of about two feet diameter, as A B (c), in a perpendicular direction. The focus of this mirror may be at 15 or 18 inches distance from its surface. At the distance of about five or six feet let there be a partition, in which there is an opening E F, equal to the size of the mirror; against this opening must be placed a picture, painted in water-colours, on a thin cloth, that the sound may easily pass through it (H).

Behind the partition, at the distance of two or three feet, place another mirror G H, of the same size as the former,

(F) According to n° 13, the distance should be 380 feet; for the first syllable must go as far as is equal to the time the two last syllables are pronouncing, that is, two-thirds of a second; therefore the distance should be equal to two-thirds of 1142 feet, or 760 $\frac{2}{3}$, that is, 380 $\frac{1}{3}$ going and coming. But as some time must be allowed for the reflecting surface to be made to vibrate by the impinging sound, the first distance, 360 feet, will be very near the truth.

(G) Both the mirrors here used may be of tin or gilt pasteboard, this experiment not requiring such as are very accurate.

(H) The more effectually to conceal the cause of this illusion, the mirror AB may be fixed in the wainscot, and a gauze or any other thin covering thrown over it, as that will not in the least prevent the sound from being reflected. An experiment of this kind may be performed in a field or garden, between two hedges, in one of which the mirror AB may be placed, and in the other an opening artfully contrived.

Entertaining Experiments, &c.

28
I. The Concave Mirror. Plate II. fig. 5.

Entertain-
ing Experi-
ments, &c.

former, and let it be diametrically opposite to it.

At the point C let there be placed the figure of a man seated on a pedestal, and let his ear be placed exactly in the focus of the first mirror: his lower jaw must be made to open by a wire, and shut by a spring; and there may be another wire to move the eyes: these wires must pass through the figure, go under the floor, and come up behind the partition.

Let a person, properly instructed, be placed behind the partition near the mirror. You then propose to any one to speak softly to the statue, by putting his mouth to the ear of it, assuring him that it will answer instantly. You then give the signal to the person behind the partition, who, by placing his ear to the focus I, of the mirror G H, will hear distinctly what the other said; and, moving the jaw and eyes of the statue by the wires, will return an answer directly, which will in like manner be distinctly heard by the first speaker.

Remark. This experiment appears to be taken from the Century of Inventions of the Marquis of Worcester; whose designs, at the time they were published, were treated with ridicule and neglect as being impracticable, but are now known to be generally, if not universally, practicable. The words of the Marquis are these: "How to make a brazen or stone head in the midst of a great field or garden, so artificial and natural, that though a man speak ever so softly, and even whisper into the ear thereof, it will presently open its mouth, and resolve the question in French, Latin, Welsh, Irish or English, in good terms, uttering it out of its mouth, and then shut it until the next question be asked."—The two following, of a similar nature, appear to have been inventions of Kircher, by means of which (as he informs us *) he used to "utter feigned and ludicrous consultations, with a view to shew the fallacy and imposture of ancient oracles."

II. Let there be two heads of plaster of Paris, placed on pedestals, on the opposite sides of a room. There must be a tin tub of a inch diameter, that must pass from the ear of one head, through the pedestal, under the floor, and go up to the mouth of the other. Observe, that the end of the tube which is next the ear of the one head, should be considerably larger than that end which comes to the mouth of the other. Let the whole be so disposed that there may not be the least suspicion of a communication.

Now, when a person speaks, quite low, into the ear of one bust, the sound is reverberated thro' the length of the tube, and will be distinctly heard by any one who shall place his ear to the mouth of the other. It is not necessary that the tube should come to the lips of the bust.—If there be two tubes, one going to the ear, and the other to the mouth, of each head, two persons may converse together, by applying their mouth and ear reciprocally to the mouth and ear of the busts; and at the same time other persons that stand in the middle of the chamber, between the heads, will not hear any part of their conversation.

III. Place a bust on a pedestal in the corner of a room, and let there be two tubes, as in the foregoing amusement, one of which must go from the mouth and the other from the ear of the bust, through the pedestal, and the floor, to an under apartment. There may be likewise wires that go from the under jaw and the eyes

of the bust, by which they may be easily moved.

A person being placed in the under room, and at a signal given applying his ear to one of the tubes, will hear any question that is asked, and immediately reply; moving at the same time, by means of the wires, the mouth and the eyes of the bust, as if the reply came from it.

IV. In a large case, such as is used for dials and spring-clocks, the front of which, or at least the lower part of it, must be of glass, covered on the inside with gauze, let there be placed a barrel-organ, which, when wound up, is prevented from playing, by a catch that takes a toothed wheel at the end of the barrel. To one end of this catch there must be joined a wire, at the end of which there is a flat circle of cork, of the same dimension with the inside of a glass tube, in which it is to rise and fall. This tube must communicate with a reservoir that goes across the front part of the bottom of the case, which is to be filled with spirits, such as is used in thermometers, but not coloured, that it may be the better concealed by the gauze.

This case being placed in the sun, the spirits will be rarefied by the heat; and, rising in the tube, will lift up the catch or trigger, and let the organ in play: which it will continue to do as long as it is kept in the sun; for the spirits cannot run out of the tube, that part of the catch to which the circle is fixed being prevented from rising beyond a certain point by a check placed over it.

When the machine is placed against the side of a room on which the sun shines strong, it may constantly remain in the same place, if you inclose it in a second case, made of thick wood, and placed at a little distance from the other. When you want it to perform, it will be only necessary to throw open the door of the outer case, and expose it to the sun.

But if the machine be moveable, it will perform in all seasons by being placed before the fire; and in the winter it will more readily stop when removed into the cold.

A machine of this sort is said to have been invented by Cornelius Dreble, in the last century. What the construction of that was, we know not; it might very likely be more complex, but could scarce answer the intention more readily.

V. UNDER the keys of a common harpsichord let there be fixed a barrel, something like that in a chamber organ, with stops or pins corresponding to the tunes you would have it play. These stops must be moveable, so that the tunes may be varied at pleasure. From each of the keys let there go a wire perpendicular down: the ends of these wires must be turned up for about one-fourth of an inch. Behind these wires let there be an iron bar, to prevent them from going too far back. Now, as the barrel turns round, its pins take the ends of the wires, which pull down the keys, and play the harpsichord. The barrel and wires are to be all inclosed in a case.

In the chimney of the same room where the harpsichord stands, or at least in one adjacent, there must be a smoke jack *, from whence comes down a wire, or cord, that, passing behind the wainscot adjoining the chimney, goes under the floor, and up one of the legs of the harpsichord, into the case, and round a small wheel fixed on the axis of that first mentioned. There should be pulleys at different distances, behind the wain-

Entertain-
ing Experi-
ments, &c.

31
A Solar So-
nata.

* *Thesaur-
gia Nova*,
sect. vi. c. 1.

29
The Com-
municative
Busts.

30
The Orac-
lar Heed.

32
Automa-
tous Harp-
sichord.

* See
Mechanics,
no 72.

Entertain-
ing Experi-
ments, &c.

foot and under the floor, to facilitate the motion of the chord.

This machinery may be applied to any other keyed instrument, as well as to chimes, and to many other purposes where a regular continued motion is required.

An instrument of this sort may be considered as a perpetual motion, according to the vulgar acceptance of the term; for it will never cease going till the fire be extinguished, or some parts of the machinery be worn out.

23
A Ventofal
Symphony.
Plate III.
fig. 6.

VI. At the top of a summer-house, or other building, let there be fixed a vane AB, on which is the pinion C, that takes the toothed wheel D, fixed on the axis EF, which at its other end carries the wheel G, that takes the pinion H. All these wheels and pinions are to be between the roof and the ceiling of the building. The pinion H is fixed to the perpendicular axis IK, which goes down very near the wall of the room, and may be covered after the same manner as are bell-wires. At the lower end of the axis IK there is a small pinion L,

that takes the wheel M, fixed on the axis of the great wheel NO. In this wheel there must be placed a number of stops, corresponding to the tunes it is to play. These stops are to be moveable, that the tunes may be altered at pleasure. Against this wheel there must hang twelve small bells, answering to the notes of the gamut. Therefore, as the wheel turns round, the stops striking against the bells, play the several tunes. There should be a fly to the great wheel, to regulate its motion when the wind is strong. The wheel NO, and the bells, are to be inclosed in a case.

Entertain-
ing Experi-
ments, &c.

There may be several sets of bells, one of which may answer to the tenor, another to the treble, and a third to the bass; or they may play different tunes, according to the size of the wheel. As the bells are small, if they are of silver, their tone will be the more pleasing.

Instead of bells, glasses may be here used, so disposed as to move freely at the stroke of the stops. This machinery may likewise be applied to a barrel-organ; and to many other uses.

Aeqs
Acquittance

A C Q. ACQS, a town at the foot of the Pyrenean mountains, in the government of Foix in France. It takes its name from the hot waters in these parts. E. long. 1. 40. lat. 43. o.

ACQUA-CHE-TAVELLA, a celebrated fountain of Italy, in Calabria Citerior, a province of Naples. It is near the mouth of the river Crata, and the ruins commonly called *Sibari Rovinata*. It has been said to beautify those who washed in it.

AQUAPENDENTE, a pretty large town of Italy, in the territory of the church, and patrimony of St Peter, with a bishop's see. It is seated on a mountain, near the river Paglia, ten miles W. of Orvieto, and 57 N. by W. of Rome. E. long. 11. 53. lat. 42. 43.

ACQUARIA, a small town of Italy, in Frigiana, a district of Modena, which is remarkable for its medicinal waters. It is twelve miles south of the city of Modena. E. long. 11. 17. lat. 44. 24.

ACQUEST, or ACQUIST, in law, signifies goods got by purchase or donation. See CONQUEST.

ACQUI, a town of Italy, in the duchy of Montserrat, with a bishop's see, and commodious baths. It was taken by the Spaniards in 1745, and retaken by the Piedmontese in 1746; but after this, it was taken again and dismantled by the French, who afterwards forsook it. It is seated on the river Bormio, 25 miles N. W. of Genoa, and 30 S. of Casal. E. long. 8. 30. lat. 44. 40.

ACQUISITION, in general, denotes the obtaining, or procuring something. Among lawyers, it is used for the right or title to an estate got by purchase or donation.

ACQUITTAL, a discharge, deliverance, or setting of a person free from the guilt or suspicion of an offence.

ACQUITTANCE, a release or discharge in writing for a sum of money, witnessing that the party has paid the said sum.—No man is obliged to pay a sum of money if the demandant refuses to give an acquittance, which is a full discharge, and bars all actions, &c. An acquittance given by a servant for a sum of money received for the use of his master, shall be a good dis-

A C R

charge for that sum, provided the servant used to receive his master's rents, debts, &c.

ACRA, a town of Africa, on the coast of Guinea, where the English, Dutch, and Danes, have strong forts, and each fort its particular village. W. long. o. 2. lat. 5. o.

ACRA, (Josephus); one of the hills of Jerusalem, on which stood the lower town, which was the Old Jerusalem; to which was afterwards added Zion, or the city of David. Probably called *Aera*, from the fortresses which Antiochus built there, in order to annoy the temple, and which Simon Maccabeus took and razed to the ground.

ACRA JARYGIA, (Pliny); *Salentina*, (Ptolemy); now *Capo di San Maria di Leuca*; a promontory in the kingdom of Naples, to the south-east of Otranto, where formerly was a town, now lying in ruins, on the Ionian sea, over against the Montes Acroceramii of Epirus.

ACRÆ, in the ancient geography, a town of Sicily, whose inhabitants were called *Acrenses*. It stood to the south of Syracuse at the distance of 24 miles, near the place now called the monastery of *Santa Maria d'Arcia*, on an eminence, as appears from Silius Italicus. The Syracusans were the founders of it, according to Thucydides, 70 years after the building of Syracuse, or 665 before Christ. Hence the epithet *Acræus*.

ACRAGAS, or AGRAGAS, (anc. geogr.) so called by the Greeks, and sometimes by the Romans (Virgil); but more generally *Agrigentum* by the latter; a town of Sicily. In Greek medals the inhabitants are called *AKPIΓANTINOI*, and *Agrigentini* by Cicero. The town stood upon a mountain, at the confluence of the Acragas and Hypsa, near the port called *Euxrogov* by Ptolemy, but *Erixov*, or the Dock, by Strabo; and in the time of the latter, scarce a trace of all that side remained. In the year before Christ 584, the people of Gela built Acragas, 108 years after building their own city. It took its name from the river running by it; and being but two miles from, enjoyed all the conveniences that could come by, the sea. It was a place of great strength, standing on the top of a very steep rock, and

Acra
||
Acrægas.

washed

Fig. 7. AGONIS ASPENNINA



Fig. 4. Speaking Trumpet;
Acoustics N. 26.



Fig. 8. ALAUDA or Lark



Fig. 1.
Vibration of STRINGS N. 9.

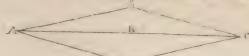


Fig. 2.
Eolian Lyre: ACOUSTICS N. 10.

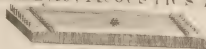


Fig. 3.
Whispering Gallery: ACOUSTICS N. 25.



Fig. 5.
Convulsive Statue: ACOUSTICS N. 28.

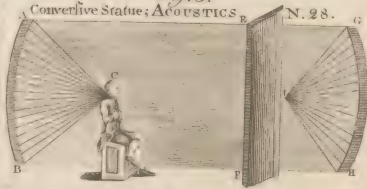
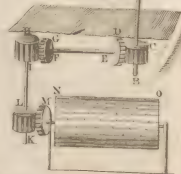


Fig. 6. Ventofal Symphony:
ACOUSTICS N. 33.



W. Bell Sculpt.

washed on the fourth side by the river Acragas, now called *Fiume di Gergenti*, and on the fourth-west by the Hypia, with a citadel to the fourth-east, externally surrounded by a deep gulf, which made it inaccessible but on the side next the town. It was famous for the tyrant Phalaris and his brazen bull. They were a people luxurious in their tables, and magnificent in their dwellings; of whom Empedocles, in Diogenes Laertius, says, that they lived to-day as if they were to die to-morrow, and built as if they were to live for ever. The country round the city was laid out in vine and olive yards, in the produce of which they carried on a great and profitable commerce with Carthage. E. long. 13. 30. lat. 37. 20.

ACRASIA, among physicians, implies the predominancy of one quality above another, either with regard to artificial mixtures, or the humours of the human body. The word is Greek, and compounded of α , priv. and $\kappa\rho\iota\sigma\tau\iota\varsigma$ to mix; q. d. not mixed in a just proportion.

ACRATH, (anc. geog.) a place in Mauritania Tingitana, (Ptolemy;) now supposed to be *Velez de Gomarra*; a fortified town in the kingdom of Fez, with a citadel and commodious harbour on the Mediterranean, scarce a mile distant from Penon de Velez, a Spanish fort. W. long. 5. lat. 34. 45.

ACRE, or ACRA, a sea-port town in Syria. It was formerly called *Ptolemais*, and is a bishop's see. It was very famous in the time of the crusades, and underwent several sieges both by the Christians and Saracens. It is now an inconsiderable town, being entirely supported by its harbour, which is frequented by ships of several nations. It is 20 miles S. of Tyre, and 37 N. of Jerusalem. E. long. 39. 25. lat. 32. 40.

ACRE, in the Mogul's dominions, the same with lack, and signifies the sum of 100,000 rupees; the rupee is of the value of the French crown of 3 livres, or 30 sols of Holland; an 100 lacks of rupees make a crown in Indostan, or 10,000,000 rupees: the pound Sterling is about eight rupees; according to which proportion, a lack of rupees amounts to 12,500 pounds Sterling.

ACRE, a measure of land used in several provinces of France, particularly Normandy. It is larger or less according to the different places; but commonly contains 160 perches.

The *ACRE of woods in France*, consists of four roods, called *vergees*; the rood is 40 perches, the perch 24 feet, the foot 12 inches, the inch 12 lines.

ACRE, the universal measure of land in Britain. An acre in England contains four square roods, a rood 40 perches or poles of 16½ feet each by statute. Yet this measure does not prevail in all parts of England, as the length of the pole varies in different counties, and is called *customary measure*, the difference running from the 16½ feet to 28. The acre is also divided into 10 square chains, of 22 yards each, that is 4840 square yards. An acre in Scotland contains 4 square roods; one square rood is 40 square fells; one square fell, 36 square ells; one square ell, nine square feet and 73 square inches; one square foot, 144 square inches. The Scots acre is also divided into 10 square chains; the measuring chain should be 24 ells in length, divided into 100 links, each link 8 $\frac{1}{4}$ inches; and so one square chain will contain 10,000 square links. The English statute-acre is about three roods and six fells

standard measure of Scotland.

The word (formed from the Saxon *acher*, or the German *aker*, a field), did not originally signify a determined quantity of land, but any open ground, especially a wide campaign; and, in this antique sense, it seems to be preserved in the names of places, as Castle-acre, Welt-acre, &c.

ACRIBEIA, a term purely Greek, literally denoting an exquisite or delicate accuracy; sometimes used in our language for want of a word of equal signification.

ACRID, a name for any thing that is of a sharp or pungent taste.

ACRIDS, in the Materia Medica. See there, n° 25, &c.

ACRIDOPHAGI, in the ancient geography; an Ethiopian people, represented as inhabiting near the deserts, and to have fed on locusts. This latter circumstance their name imports; the word being compounded of the Greek $\alpha\kappa\rho\iota\varsigma$ locusts, and $\varphi\alpha\gamma\omega$ to eat. We have the following account of them by Diodorus Siculus*.

Their stature was lower than that of other men; they were meagre, and extremely black. In the spring, high west winds drove from the desert to their quarter locusts of an extraordinary size, and remarkable for the squalid colour of their wings. So great was the number of these insects, that they were the only sustenance of the barbarians, who took them in the following manner: At the distance of some stadia from their habitations there was a wide and deep valley. They filled this valley with wood and wild herbs, with which their country abounded. When the cloud of locusts appeared, which were driven on by the wind, they set fire to the fuel which they had collected. The smoke which arose from this immense fire was so thick, that the locusts, in crossing the valley, were stifled by it, and fell in heaps on the ground. The passage of the locusts being thus intercepted for many days, they made a large provision of those insects. As their country produced great quantities of salt, they salted them, to render them more palatable, and to make them keep till the next season. This peculiar supply was their sole food: they had neither herds nor flocks. They were unacquainted with fishing; for they lived at a distance from the sea. They were very active, and ran with great swiftness. But their life was not of long duration; it exceeded not forty years. The close of their life was extremely miserable; for in their old-age, winged lice of different, but all of ugly forms, bred in their bodies. This malady, which began in the breast and belly, soon spread through the whole frame. The patient at first felt an itching; and the agreeable sensation produced by his scratching of himself, preceded a most deplorable calamity. For when those lice, which had bred in his body, forced their way out, they caused effusions of corrupt blood, with excruciating pains in the skin. The unhappy man, with lamentable cries, was industrious himself to make passages for them with his nails. In short, these lice issued forth successively from the wounds made by the hands of the patient, as from a vessel full of holes, and in such numbers that it was impossible to exterminate them.—Whether this extraordinary and dreadful distemper was occasioned by the food of the inhabitants of this country, or by a pestilential quality of their climate, it is difficult to determine. Indeed, as to the

* Lib. iii.
& xxxix.
Alfo Strabo,
lib. xvi.

Acridophagi
||
Acroamati-
ci.

credibility of the whole account, we must leave the reader to judge.—But though the circumstances of these people should be deemed fabulous, yet may the *acridophagia* be true. It is well known, that to this day the inhabitants of Ethiopia, Arabia, &c. frequently use locusts as food. The reader will not be displeased if we lay before him the result of Dr Hasselquist's inquiries as to this particular, who travelled in Syria and Egypt so late as the year 1752. This ingenious gentleman, who travelled with a view to improve natural history, informs us, that he asked Franks, and many other people who had lived long in these countries, whether they had ever heard that the inhabitants of Arabia and Ethiopia, &c. used locusts as food. They answered that they had. He likewise asked the same question of Armenians, Cophites, and Syrians, who lived in Arabia, and had travelled in Syria and near the Red-sea; some of whom said they heard of such a practice, and others that they had often seen the people eat these insects. He at last obtained complete satisfaction on this head from a learned sheik at Cairo, who had lived six years in Mecca. This gentleman told him, in presence of M. le Grand the principal French interpreter at Cairo, and others, that a famine frequently rages at Mecca when there is a scarcity of corn in Egypt, which obliges the inhabitants to live upon coarser food than ordinary: That when corn is scarce, the Arabians grind the locusts in hand-mills, or stone-mortars, and bake them into cakes, and use these cakes in place of bread: That he has frequently seen locusts used by the Arabians, even when there was no scarcity of corn; but then they boil them, stew them with butter, and make them into a kind of fricassée, which he says is not disagreeably tasted, for he had sometimes tasted these locust-fricassées out of curiosity. From this account, we may see the folly of that dispute among divines about the nature of St John's food in the wilderness: some maintaining the original word to signify the fruits of certain trees; others, a kind of birds, &c.: but those who adhered to the literal meaning of the text were at least the most orthodox, although their arguments were perhaps not so strong as they might have been, had they had an opportunity of quoting such an author as Hasselquist.

ACRIMONY, that quality in bodies which renders them acrid to the taste.

Morbific ACRIMONY. See MEDICINE, n° 127,—132, and 263.

ACRISIUS, king of Argos, (fab. hist.) being told by the oracle he that should be killed by his grandchild, shut up his only daughter Danaë in a brazen tower: but Jupiter coming down in a golden shower, begot Perseus upon her: after Perseus had slain the Gorgons, he carried Medusa's head to Argos; which Acrisius seeing, was turned into a statue.

ACRITAS, (anc. geogr.) a promontory of Messenia, near Methone, (Ptolemy); running into the sea, and forming the beginning of the bay of Messene. Now called *Capo di Gallo*, between Methone to the west, and Corone to the east, where the Sinus Coronæus begins.

ACRIVIOLA. See TROPÆOLUM.

ACROAMATIC, or ACRATIC, in general, denotes a thing sublime, profound, or abstruse.

ACROAMATICI, a denomination given the dis-

ciples or followers of Aristotle, &c. who were admitted into the secrets of the inner or acroamatic philosophy.

ACROATIC. Aristotle's lectures to his disciples were of two kinds, *exoteric* and *acroatic*. The acroatic were those, to which only his own disciples and intimate friends were admitted; whereas the exoteric were public and open to all. But there are other differences. The acroatic were set apart for the higher and more abstruse subjects; the exoteric were employed in rhetorical and civil speculations. Again, the acroatics were more subtle and exact, evidence and demonstration being here aimed at; the exoterics chiefly aimed at the probable and plausible. The former were the subject of the mornings exercises in the Lyceum, the latter of the evenings. Add, that the exoterics were published: whereas the acroatics were kept secret; being either entirely concealed; or if they were published, it was in such obscure terms, that few but his own disciples would be the wiser for them. Hence, when Alexander complained of his preceptor for publishing his acroatics, and thus revealing what should have been reserved to his disciples, Aristotle answered, that they were made public and not public; for that none who had not heard them explained by the author *viva voce*, would understand them.

ACROATHOUM, or ACROTHOUM, (anc. geogr.) a town situated on the top of mount Athos, where the inhabitants, according to Mela, were longer lived by half than in any other country: called by the modern Greeks, *Αγιον ορος*; by the Italians, *La Cima di Monte Santo*.

ACROCERAUNIA, or MONTES CERAUNI, (anc. geogr.) mountains running out into the sea, (so called from their being often thunder-struck); separating the Ionian sea from the Adriatic; where Illyria ends and Epirus begins, (Horace): now called *Monti della Chi-mera*.

ACROCORINTHUS, (anc. geogr.) a high and steep hill, hanging over the city of Coriath, which was taken within the walls, as an acropolis, or citadel. On its top stood a temple of Venus; and lower down issued the fountain Pyrene, yielding not a plentiful, but a clear stream of water, (Pliny.)

ACROMION, in anatomy, the upper part of the scapula. See ANATOMY, n° 45, 46.

ACROMONOGRAMMATICUM, in poetry, a kind of poem, wherein every subsequent verse begins with the letter wherewith the immediately preceding one terminated.

ACRON, a celebrated physician of Agrigentum, who first thought of lighting large fires, and purifying the air with perfumes, to put a stop to the pestilence that ravaged Athens, and which was attended with success. He lived about four hundred and seventy three years before the Christian era.

ACRON, a territory on the gold-coast of Guinea, in Africa, bordering on the Fantynen country. The Dutch have a fort here, called Fort Patience; and under it is a village, inhabited only by fishermen. The other inhabitants are addicted to husbandry, and sell their corn to other countries. There is plenty of game, which is very commodious for the Dutch factory. The people are very ignorant, and go naked like the rest of the negroes. This is called Little Acron; for Great Acron

Acroatic
||
Acron.

Acronical Acron is farther inland, and is a kind of a republic.

ACRONICAL, **ACHRONICAL**, or **ACHRONICAL**, in astronomy, is a term applied to the rising of a star, when the sun is set in the evening; but has been promiscuously used to express a star's rising at sunset, or setting at sunrise.

ACROPOLIS, (anc. geogr.) the citadel, and one of the divisions, of Athens; called *Polis*, because constituting the first and original city; and the *Upper Polis*, to distinguish it from the Lower, which was afterwards built round it in a large open plain, the Acropolis standing on a rock or eminence in the heart of this plain; and hence its name: (Pausanias). To the north it had a wall, built by the Pelasgi, and therefore called *Pelasgic*; and to the south a wall, by Cymon the son of Miltiades, out of the Persian spoils, many ages after the building of the north wall, (Plutarch). It had nine gates, and was therefore called *Enneapylon*; yet but one principal gate or entrance, the ascent to which was by a flight of steps of white marble, built by Pericles with great magnificence, (Plutarch).

ACROPOLITA (George), one of the writers of the Byzantine history, was born at Constantinople, in the year 1220, and brought up at the court of the emperor John Ducas at Nice. He was employed in the most important affairs of the empire; being sent ambassador to Larissa, to establish a peace with Michael of Epirus; and was constituted judge to try Michael Comnenus, suspected of engaging in a conspiracy. Theodorus Lascaris, the son of John, whom he had taught logic, appointed him governor of all the western provinces in his empire. In 1255, he was taken prisoner in a war with Michael Angelus; but gaining his liberty in 1260, by means of the emperor Palæologus, he was sent by him ambassador to Constantine prince of Bulgaria; and was employed in several other negotiations. He wrote, *A Continuation of the Greek History*, from the taking of Constantinople by the Latins, till it was recovered by Michael Palæologus in 1261, which makes part of the Byzantine history; *A Treatise concerning Faith, Virtue, and the Soul*; *An Exposition upon the Sermons of St Gregory Nazianzen*; and other pieces. Gregory Cyprian, patriarch of Constantinople, in his encomium upon him, prefixed to Acropolita's history, is perhaps somewhat extravagant in his praise, when he says he was equal to Aristotle in philosophy, and to Plato in the knowledge of divine things and Attic eloquence.

ACROSPIRE, a vulgar term for what botanists call the *plume*. See *PLANTS*, n° 5.

ACROSPIRED, in malt-making, is the grain's shooting both at the root and blade end.

ACROSTIC, in poetry, a kind of poetical composition disposed in such a manner, that the initial letters of the verses form the name of some person, kingdom, place, motto, &c. The word is compounded of the Greek *ακρῶς* *extremity*, and *στιχὶς* *verse*. The acrostic is considered by the critics as a species of false wit, and is therefore very little regarded by the moderns.

ACROSTICUM, or **RUSSYACK**, in botany, a genus of the cryptogamia filices, of which there are 30 species, but only three of them natives of Britain, viz. the septentrionale, or horned fern, which grows on walls or cliffs of rocks; the ilvense, or hairy fern, grow-

ing in cliffs of rocks; and the thelypteris, or marsh-fern, in turfey bogs.

ACROSTOLIUM, in ancient naval architecture, the extreme part of the ornament used on the prows of their ships, which was sometimes in the shape of a buckler, helmet, animal, &c.; but more frequently circular, or spiral. It was usual to tear them from the prows of vanquished vessels, and fix them to the conquerors, as a signal of victory.

ACROTELEUTIC, among ecclesiastical writers, an appellation given to any thing added to the end of a psalm; as the Gloria Patri, or Doxology.

ACROTHERIA, in architecture, small pedestals, usually without bases, anciently placed at the middle or two extremes of pediments or frontispieces, serving to support the statues, &c. It also signifies the figures placed as ornaments on the tops of churches, and the sharp pinnacles that stand in ranges about flat buildings with rails and ballusters.

Among ancient physicians, it signified the larger extremities of the body, as the head, hands, and feet. It has also been used for the tips of the fingers, and sometimes for the eminences or processes of bones.

ACROTHYMION, from *ακρῶς* *extreme*, and *θυμὴ* *thyme*. A sort of wart described by Celsus, as hard, rough, with a narrow basis, and broad top; the top is of the colour of thyme, it easily splits and bleeds. This tumour is also called *thymus*.

ACSOR, a town in the river Nile in Egypt, famed for its earthen ware.

ACT, in general, denotes the exertion of power; and differs from power, as the effect from the cause.

Act, in logic, is particularly understood of an operation of the human mind. Thus to discern and examine, are acts of the understanding; to judge and affirm, are acts of the will. There are voluntary and spontaneous acts; the former are produced by the operation of the soul, the latter without its privity or participation.

Act, in the universities, signifies a thesis maintained in public by a candidate for a degree, or to shew the capacity and proficiency of a student. The candidates for a degree of bachelor and master of arts are to hold philosophical Acts; and those for bachelor of divinity, theological Acts, &c. At Oxford, the time when masters or doctors complete their degrees is also called the *act*; which is held with great solemnity. At Cambridge, they call it the *commencement*.

Act, among lawyers, is an instrument in writing for declaring or justifying the truth of any thing. In which sense, records, decrees, sentences, reports, certificates, &c. are called *acts*.

Acts, also denote the deliberations and resolutions of an assembly, senate, or convention; as acts of parliament, &c. Likewise matters of fact transmitted to posterity in certain authentic books and memoirs.

Acts of the senate, (*Acta Senatus*), among the Romans, were minutes of what passed and was debated in the senate-house. These were also called *Commentarii*, and by a Greek name *νεκρολογια*. They had their origin in the consulship of Julius Cæsar, who ordered them both to be kept and published. The keeping them was continued under Augustus, but the publication was abrogated. Afterwards all writings, relating to the decrees or sentences of the judges, or what passed

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and was done before them, or by their authority, in any cause, were also called by the name *Acta*: In which sense we read of civil acts, criminal acts, intervenient acts; *acta civilia, criminalia, intervenientia, &c.*

Acts of the people, (Acta Populi), among the Romans, were journals or registers of the daily occurrences; as assemblies, trials, executions, buildings, births, marriages, deaths, &c. of illustrious persons, and the like. These were otherwise called *Acta Publica*, and *Acta Diurna*, or simply *Acta*. The *Acta* differed from *Annals*, in that only the greater and more important matters were in the latter, and those of less note were in the former. Their origin is attributed to Julius Cæsar, who first ordered the keeping and making public the acts of the people. Some trace them higher, to Servius Tullius; who, to discover the number of persons born, dead, and alive, ordered that the next of kin, upon a birth, should put a certain piece of money into the treasury of Juno Lucina; upon a death, into that of Venus Libitina: the like was also to be done upon affuming the toga virilis, &c. Under Marcus Antoninus, this was carried further: persons were obliged to notify the births of their children, with their names, and surnames, the day, consul, and whether legitimate or spurious, to the prefects of the *Ærarium Saturni*, to be entered in the public acts; though before this time the births of persons of quality appear to have thus been registered.

* See
Diplomatics.

Public Acts. The knowledge of public acts forms part of a peculiar science, called the *diplomatic* *, of great importance to an historian, statesman, chronologist, and even critic. The preservation of them was the first occasion of erecting libraries. The style of acts is generally barbarous Latin. Authors are divided as to the rules of judging of their genuineness, and even whether there be any certain rules at all. F. Germon will have the greater part of the acts of former ages to be spurious. Pontanini asserts, that the number of forged acts now extant is very small. It is certain there were severe punishments inflicted on the forgers and falsifiers of acts.—The chief of the English acts, or public records, are published by Rymer, under the title of *Fœdera*, and continued by Saunderson; an extract whereof has been given in French by Rapin, and translated into English under the title of *Acta Regia*. Great commendations have been given this work: also some exceptions made to it; as that there are many spurious acts, as well as errors, in it; some have even charged it with falsifications.—The public acts of France fell into the hands of the English after the battle of Poitiers, and are commonly said to have been carried by them out of the country. But the tradition is not supported by any sufficient testimony.

Acts of the Apostles, one of the sacred books of the New Testament, containing the history of the infant-church, during the space of 29 or 30 years, from the ascension of our Lord to the year of Christ 63.—It was wrote by St Luke; and addressed to Theophilus, the person to whom the evangelist had before dedicated his gospel. We here find the accomplishment of several of the promises made by our Saviour; his ascension; the descent of the Holy Ghost; the first preaching of the apostles, and the miracles whereby their doctrines were confirmed; an admirable picture of the manners of the primitive Christians; and, in short, every thing that

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passed in the church till the dispersion of the apostles, who separated themselves in order to propagate the gospel throughout the world. From the period of that separation, St Luke quits the history of the other apostles, who were then at too great a distance from him, and confines himself more particularly to that of St Paul, who had chosen him for the companion of his labours. He follows that apostle in all his missions, and even to Rome itself; for it appears that the Acts were published in the second year of St Paul's residence in that city, or the 36th year of the Christian æra, and in the 9th or 10th year of Nero's reign. The style of this work, which was originally composed in Greek, is much purer than that of the other canonical writers; and it is observable, that St Luke, who was much better acquainted with the Greek than with the Hebrew language, always, in his quotations from the Old Testament, makes use of the Septuagint version. The council of Laodicea places the Acts of the Apostles among the canonical books, and all the churches have acknowledged it as such without any controversy.

There were several *Spurious Acts of the Apostles*; particularly, I. *Acts*, supposed to be written by Abdias *, the pretended bishop of Babylon, who gave out that he was ordained bishop by the apostles themselves when they were upon their journey into Persia. II. *The Acts of St Peter*: this book came originally from the school of the Ebionites. III. *The Acts of St Paul*, which is entirely lost. Eusebius, who had seen it, pronounces it of no authority. IV. *The Acts of St John the Evangelist*; a book made use of by the Encratites, Manichæans, and Priscillianists. V. *The Acts of St Andrew*; received by the Manichæans, Encratites, and Apotactics. VI. *The Acts of St Thomas the apostle*; received particularly by the Manichæans. VII. *The Acts of St Philip*. This book the Gnostics made use of. VIII. *The Acts of St Matthias*. Some have imagined, that the Jews for a long time had concealed the original acts of the life and death of St Matthias, written in Hebrew; and that a monk of the abbey of St Matthias at Treves, having got them out of their hands, procured them to be translated into Latin, and published them. But the critics will not allow them to be authentic. See *CANON*.

Acts of Pilate; a relation sent by Pilate to the emperor Tiberius, concerning Jesus Christ, his death, resurrection, ascension, and the crimes of which he was convicted before him *. It was a custom among the Romans, that the proconsuls and governors of provinces should draw up acts, or memoirs, of what happened in the course of their government, and send them to the emperor and senate. The heretics corrupted these acts, at least forged others in imitation of them; and, in the reign of the emperor Maximin, the Gentiles, to throw an odium on the Christian name, spread about spurious Acts of Pilate; which the emperor, by a solemn edict, ordered to be sent into all the provinces of the empire, and enjoined the school-masters to teach and explain them to their scholars, and make them learn them by heart. These acts, both the genuine and the spurious, are lost. There is indeed extant, in the Pseudo-Hegeippus, a letter from Pilate to the emperor Claudius, concerning Jesus Christ †. But it discovers itself at first sight not to be authentic.

Act of Faith, Auto da Fe, in the Romish church,

* See Abdias.

* Eusebii
Hist. Eccles.
lib. ii. cap. 2.
and ix. 5.

† Cave Hist.
Literar. Sæ.
Apostol.

Act
of faith.
see Inqui-
sition.

is a solemn day held by the inquisition, for the punishment of heretics, and the abolition of the innocent accused. They usually contrive the *Auto* to fall on some great festival, that the execution may pass with the more awe and regard; at least it is always on a Sunday.

The *Auto da Fe* may be called the last act of the inquisitorial tragedy; it is a kind of goal-delivery, appointed as oft as a competent number of prisoners in the inquisition are convicted of heresy, either by their own voluntary, or extorted confession, or on the evidence of certain witnesses. The process is thus: in the morning, they are brought into a great hall, where they have certain habits put on, which they are to wear in the procession. The procession is led up by dominican friars; after which come the penitents, some with fan-benitoes, and some without, according to the nature of their crimes; being all in black coats without sleeves, and bare-footed, with a wax candle in their hands. These are followed by the penitents who have narrowly escaped being burnt, who over their black coats have flames painted with their points turned downwards, *Fuego revolto*. Next come the negative, and relapsed, who are to be burnt, having flames on their habits pointing upwards. After these come such as profess doctrines contrary to the faith of Rome, who, besides flames pointing upwards, have their picture painted on their breasts, with dogs, serpents, and devils, all open-mouthed, about it. Each prisoner is attended with a familiar of the inquisition; and those to be burnt have also a Jesuit on each hand, who are continually preaching to them to abjure. After the prisoners, comes a troop of familiars on horseback; and after them the inquisitors, and other officers of the court, on mules; last of all, the inquisitor-general on a white horse, led by two men with black hats and green hat-bands. A scaffold is erected in the *Terreiro de Paio*, big enough for two or three thousand people; at one end of which are the prisoners, at the other the inquisitors. After a sermon made up of encomiums of the inquisition, and invectives against heretics, a priest ascends a desk near the middle of the scaffold, and having taken the abjuration of the penitents, recites the final sentence of those who are to be put to death; and delivers them to the secular arm, earnestly beseeching at the same time the secular power not to touch their blood or put their lives in danger. The prisoners being thus in the hands of the civil magistrate, are presently loaded with chains, and carried first to the secular goal, and from thence in an hour or two brought before the civil judge, who, after asking in what religion they intend to die, pronounces sentence, on such as declare they die in the communion of the church of Rome, that they shall be first strangled, and then burnt to ashes; on such as die in any other faith, that they be burnt alive. Both are immediately carried to the Ribera, the place of execution; where there are as many stakes set up as there are prisoners to be burnt, with a quantity of dry furz about them. The stakes of the professed, that is, such as persist in their heresy, are about four yards high, having a small board towards the top for the prisoner to be seated on. The negative and relapsed being first strangled and burnt, the professed mount their stakes by a ladder; and the Jesuits, after several repeated exhortations to be reconciled to the church, part with them, telling them they leave them to the devil, who

is standing at their elbow to receive their souls, and carry them with him into the flames of hell. On this a great shout is raised; and the cry is, Let the dogs be made; which is done by thrusting flaming furzes fastened to long poles against their faces, till their faces are burnt to a coal, which is accompanied with the loudest acclamations of joy. At last, fire is set to the furz at the bottom of the stake, over which the professed are chained so high, that the top of the flame seldom reaches higher than the seat they sit on, so that they rather seem roasted than burnt. There cannot be a more lamentable spectacle; the sufferers continually cry out, while they are able, *Misericordia per amor de Dios*: yet it is beheld by all sexes, and ages, with transports of joy and satisfaction.

ACT, in dramatic poetry, signifies a certain division, or part, of a play, designed to give some respite both to the actors and spectators. The Romans were the first who divided their theatrical pieces into acts; for no such divisions appear in the works of the first dramatic poets. Their pieces indeed consisted of several parts or divisions, which they called *protasis*, *epitasis*, *catastasis*, and *catastrophe*; but these divisions were not marked by any real interruptions on the theatre. Nor does Aristotle mention any thing of acts in his Art of Poetry. But, in the time of Horace, all regular and finished pieces were divided into five acts.

Neuve minor, neu sit quinto productior actu Fabula, que posci vult et spectata reponi.

The first act, according to some critics, besides introducing upon the stage the principal characters of the play, ought to propose the argument or subject of the piece; the second, to exhibit this to the audience, by carrying the fable into execution; the third, to raise obstacles and difficulties: the fourth to remove these, or raise new ones in the attempt; and the fifth, to conclude the piece, by introducing some accident that may unravel the whole affair. This division, however, is not essentially necessary; but may be varied according to the humour of the author, or the nature of the subject. See POETRY, Part I. chap. ii.

ACT of grace. See GRACE.

ACT of Parliament is a positive law, consisting of two parts, the words of the act, and its true sense and meaning; which being joined, make the law. The words of acts of parliament should be taken in a lawful sense. Cases of the same nature are within the intention, though without the letter, of the act; and some acts extend by equity to things not mentioned therein.

ACTÆA, ACONITUM RACEMOSUM, HERB CRISTOPHER, or BANE-BERRIES; a genus of the monogynia order, belonging to the polyandria class of plants, of which there are four

Species. 1. The spicata, or common herb-christopher, is a native in several parts of Britain. It grows to the height of about two feet and an half; the foot-stalks of the leaves arise from the root; these divide into three smaller foot-stalks, each of which are again divided into three, and these have each three lobes; so that each leaf is composed of 27 lobes or smaller leaves. The flowers grow in ramous spikes, and are of a pure white; they grow upon a slender, jointed, and furrowed stem; appear in May; and are succeeded by black, shining, pulpy berries, about the size of peas, which ripen in the autumn. This plant is a powerful repellent.

Act
Actus.

Actea,
Actæon.

lent, and the root has been used internally in some nervous cases, but must be administered with caution. The berries are highly poisonous. It is said toads resort to this plant, on account of its fetid smell. Sheep and goats eat it; cows, horses, and swine, refuse it. 2. The alba, or American herb-christopher, is a native of North America. The leaves of this species are somewhat like the former, but not so deeply indented in the edges. The flowers grow in a more compact spike, and the berries are very white and transparent when ripe; the roots are composed of thick knobs. This species has been used as an emetic, and sometimes called *ipacacouanha*. 3. The racemosa, or American black or wild snake-root, is likewise a native of North America. It has large compound leaves, rising immediately from the root, and branched after the same manner as the first, which grow more than two feet high. The flower-stem rises to the height of four or five feet; and carries a long spike of white flowers reflexed at the top. These appear in June or the beginning of July, but the seeds do not come to maturity in Britain.—The root of this plant is greatly used by physicians in North America, in many disorders; and is supposed to be an antidote against poison, or the biting of a rattle-snake. 4. The cimicifuga, is a native of Siberia; the leaves resemble those of the feathered columbine; the stalks rise little more than a foot high, supporting panicles of white flowers, which appear in May. This species is rare in Britain.

Culture. The first species hath a perennial root, but the stalks annually decay. It may be propagated either by seeds, or parting the roots, which should be transplanted in autumn. The seeds should be sown soon after they are ripe, or they will lie a whole year in the ground before they vegetate. They should be sown in a shady border; and as all the plants do not come up at the same time, the border should not be disturbed till the following autumn, when they should be transplanted into a shady border, where they may be allowed to remain and flower.—The second species may be propagated in the same manner; only the plants should be allowed three feet every way, an account of their wide-spreading leaves. This species delights in a light moist soil, and a shady situation.—The third is usually propagated by seeds sent annually from North America: it thrives in the same kind of soil as the former; and is very hardy, requiring no other culture than the common flowering shrubs. The plants should not be often removed, for that will prevent their flowering strong.—The fourth requires a moist loamy soil, and shady situation. It may be propagated in the same manner as the others.

ACTÆON, in fabulous history, the son of Aristæus and Autonoe; a great hunter. He was turned by Diana into a stag, for looking on her while bathing; and died by his own dogs.

ACTE, **ACTEA**, or **ATTIS**, ancient names of Attica. Pliny extends it to the isthmus of Corinth, so as to include Megaris. Others make this last a distinct district, because Megara was always the rival and enemy of the Athenians. If so, then Attica was bounded on the west by Megara; on the north by Boeotia, separated from it by high mountains, thro' which there was a difficult passage; on the south by the Saronic bay, with the Egean sea on the east. It was called

Acte from its maritime situation; hence *Actica* and *Attica*, and the epithets *Actæus* and *Atticus*, *Œtid*. Hence also *Actias* for *Atheniensis*, Virgil.

ACTIAN GAMES, in Roman antiquity, were solemn games instituted by Augustus, in memory of his victory over Marc Anthony at Actium, held every fifth year, and celebrated in honour of Apollo, since called *Actius*. Hence *Actian Years*, an æra commencing from the battle of Actium, called the *Æra of Augustus*.

ACTION, in a general sense, implies nearly the same thing with *act* *.—Grammarians, however, observe some distinction between *action* and *act*; the former being generally restricted to the common or ordinary transactions, whereas the latter is used to express those which are remarkable. Thus, we say it is a good *action* to comfort the unhappy; it is a generous *act* to deprive ourselves of what is necessary, for their sake. The wife man proposes to himself an honest end in all his *actions*; a prince ought to mark every day of his life with some *act* of greatness. The abbé Girard makes a further distinction between the words *action* and *act*. The former, according to him, has more relation to the power that acts than the latter; whereas the latter has more relation to the effect produced than the former; and hence the one is properly the attribute of the other. Thus we may properly say, "Be sure to preserve a "presence of mind in all your actions; and take care that they are all acts of equity."

ACTION, in mechanics, implies either the effort which a body or power makes against another body or power, or the effect itself of that effort.

As it is necessary in works of this kind to have a particular regard to the common language of mechanics and philosophers, we have given this double definition; but the proper signification of the term is the motion which a body really produces, or tends to produce, in another; that is, such is the motion it would have produced, had nothing hindered its effect.

All power is nothing more than a body actually in motion, or which tends to move itself; that is, a body which would move itself if nothing opposed it. The action therefore of a body is rendered evident to us by its motion only; and consequently we must not fix any other idea to the word action, than that of actual motion, or a simple tendency to motion. The famous question relating to *vis viva*, and *vis mortua*, owes, in all probability, its existence to an inadequate idea of the word action; for had Leibnitz and his followers observed, that the only precise and distinct idea we can give to the word force or action, reduces it to its effect, that is, to the motion it actually produces or tends to produce, they would never have made that curious distinction.

Quantity of ACTION, a name given by M. de Maupertuis, in the Memoirs of the Parisian Academy of Sciences for 1744, and those of Berlin for 1746, to the product of the mass of a body by the space which it runs through, and by its celerity. He lays it down as a general law, "that, in the changes made in the state of a body, the quantity of action necessary to produce such change is the least possible." This principle he applies to the investigation of the laws of refraction, of equilibrium, &c. and even to the ways of acting employed by the Supreme Being. In this manner M. de Maupertuis attempts to connect the metaphysics,

Actum,
Actio.

* See *Act*.

Action.

physics of final causes with the fundamental truths of mechanics, to shew the dependence of the collision of both elastic and hard bodies upon one and the same law, which before had always been referred to separate laws; and to reduce the laws of motion, and those of equilibrium, to one and the same principle.

* See *Moral Philosophy*, n° 35, &c.

ACTION, in ethics, denotes the external signs or expressions of the sentiments of a moral agent *.

ACTION, in poetry, the fame with subject or fable. Critics generally distinguish two kinds, the principal and the incidental. The principal action is what is generally called the *fable*; and the incidental an *episode* *.

* See *Poetry*, Part I. ch. iii.

ACTION, in oratory, is the outward deportment of the orator, or the accommodation of his countenance, voice, and gesture, to the subject of which he is treating. See ORATORY, Part IV.

ACTION, in a theatrical sense. See DECLAMATION, Art. IV.

ACTION for the Pulpit. See DECLAMATION, Art. I.

ACTION, in painting and sculpture, is the attitude or position of the several parts of the face, body, and limbs of such figures as are represented, and whereby they seem to be really actuated by passions. Thus we say, the action of such a figure finely expresses the passions with which it is agitated: we also use the same expression with regard to animals.

ACTION, among physicians, is applied to the functions of the body, whether vital, animal, or natural.

The *vital* functions, or actions, are those which are absolutely necessary to life, and without which there is no life, as the action of the heart, lungs, and arteries. On the action and reaction of the solids and fluids on each other, depend the vital functions. The pulse and respiration are the external signs of life. Vital diseases are all those which hinder the influx of the venous blood into the cavities of the heart, and the expulsion of the arterial blood from the same.—The *natural* functions are those which are instrumental in repairing the several losses which the body sustains; for life is destructive of itself, its very offices occasioning a perpetual waste. The mastication of food, the deglutition and digestion thereof, also the separation and distribution of the chyle and excrementitious parts, &c. are under the head of natural functions, as by these our aliment is converted into our nature. They are necessary to the continuance of our bodies.—The *animal* functions are those which we perform at will, as muscular motion, and all the voluntary actions of the body: they are those which constitute the senses of touch, taste, smell, sight, hearing; perception, reasoning, imagination, memory, judgment, affections of the mind. Without any, or all of them, a man may live, but not so comfortably as with them *.

* See *Medicine*, Part I. (Physiol.) ch. iii. iv. v. and *Anat.* n° 366, &c. 368, &c. 401, &c.

ACTION, in commerce, is a term used abroad for a certain part or share of a public company's capital stock. Thus, if a company has 400,000 livres capital stock, this may be divided into 400 actions, each consisting of 1000 livres. Hence a man is said to have two, four, &c. actions, according as he has the property of two, four, &c. 1000 livres capital stock. The transferring of actions abroad is performed much in the same manner as stocks are with us. See STOCKS.

† See *Laws*, n° lxxvii. 1, 6. cii. 4. exil. 1, 2, & cxxxiii, throughout.

ACTION, in law, is a demand made before a judge for obtaining what we are legally entitled to demand, and is more commonly known by the name of law-suit or process †.

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ACTIONARY, or ACTIONIST, a proprietor of stock in a trading company.

Actionary
Actors.

ACTIONS, among merchants, sometimes signify moveable effects; and we say the merchant's creditors have seized on all his actions, when we mean that they have taken possession of all his active debts.

ACTIVE, denotes something that communicates action or motion to another; in which acceptation it stands opposed to passive.

ACTIVE, in grammar, is applied to such words as express action; and is therefore opposed to passive. The active performs the action, as the passive receives it *.

* See *Grammar*, n° 49.

ACTIVE Principles, in chemistry, such as are supposed to act without any assistance from others; as mercury, sulphur, &c.

ACTIVITY, in general, denotes the power of acting, or the active faculty. See ACTIVE.

Sphere of ACTIVITY, the whole space in which the virtue, power, or influence, of any object, is exerted.

ACTIUM, (anc. geogr.) a town situated on the coast of Acarnania, in itself inconsiderable, but famous for a temple of Apollo, a safe harbour, and an adjoining promontory of the same name, in the mouth of the Sinus Ambracius, over against Nicopolis, on the other side of the bay: it afterwards became more famous on account of Augustus's victory over Antony and Cleopatra; and for quinquennial games instituted there, called *Adia*, or *Ludi Adiaci*. Hence the epithet *Actius*, given to Apollo, (Virgil.) *Adiaca ara*, a computation of time from the battle of Actium. The promontory is now called *Capo di Figale*.

ACTIUS, in mythology, a surname of Apollo, from Actium, where he was worshipped.

ACTON, a town near London, where is a well that affords a purging water, which is noted for the pungency of its salt. This water is whitish, to the taste it is sweetish, with a mixture of the same bitter which is in the Epfom water. The salt of this water is not quite so soft as that of Epfom, and is more calcareous than it, being more of the nature of the salt of lime: for a quantity of the Acton water being boiled high, on being mixed with a solution of sublimated in pure water, threw down a yellow sediment. The salt of the Acton water is more nitrous than that of Epfom; it strikes a deep red, or purple, with the tincture of logwood in brandy, as is usual with nitrous salts; it does not precipitate silver out of the spirit of nitre, as common salt does: 1b of this water yields 48 grains of salt.

ACTOR, in general, signifies a person who acts or performs something.

Actor, in the drama, is a person who represents some part or character upon the theatre: The drama consisted originally of nothing more than a simple chorus, who sung hymns in honour of Bacchus; so that the primitive actors were only singers and musicians. Thespis was the first that, in order to ease this unformed chorus, introduced a declaimer, who repeated some heroic or comic adventure. Æschylus, finding a single person too few, attempted to introduce a second, and changed the ancient recitals into dialogues. He also dressed his actors in a more majestic manner, and introduced the conthurnus or buskin *. Sophocles added a third, in order to represent the various incidents in a more natural manner; and here the Greeks stopped, at least we do not find in any of their tragedies above

* See *Æschylus*.

K

three

Actor
||
Actuate.

Actus
||
Acuna.

three persons in the same scene: perhaps they looked upon it as a rule of the dramatic poem never to admit more than three speakers at a time on the stage; a rule which Horace has expressed in the following verse:

Nec quarta loqui persona laborat.

This however did not prevent their increasing the number of actors in comedy. Before the opening of a play, they named their actors in full theatre, together with the parts they were to perform. The ancient actors were masked, and obliged to raise their voice extremely, in order to make themselves heard by the innumerable crowd of people who filled the amphitheatres: they were accompanied with a player on the flute, who played a prelude, gave them the tone, and played while they declaimed. Actors were highly honoured at Athens; and despised at Rome, where they were not only denied all rank among the citizens, but even when any citizen appeared upon the stage, he was expelled his tribe, and deprived of the right of suffrage by censors. Cicero, indeed, esteems the talents of Roscius; but he values his virtues still more: virtues which distinguished him so remarkably above all others of his profession, that they seemed to have excluded him from the theatre. The French have, in this respect, adopted the ideas of the Romans; and the English those of the Greeks.

ACTOR, the name of several persons in fabulous history. One *Actor* among the Aurunzi is described by Virgil, as an hero of the first rank. *Æn.* xii.

ACTORUM TABULÆ, in antiquity, were tables instituted by Servius Tullius, in which the births of children were registered. They were kept in the treasury of Saturnus.

ACTRESS, a woman who performs a part upon the stage. Women actors were unknown to the ancients, among whom men always performed the female character; and hence one reason for the use of masks among them.

ACTUAL, something that is real and effective, or that exists truly and absolutely. Thus philosophers use the terms *actual* heat, *actual* cold, &c. in opposition to *virtual* or *potential*. Hence, among physicians, a red-hot iron, or fire, is called an *actual* cautery; in distinction from cauteries, or caustics, that have the power of producing the same effect upon the animal solids as actual fire; these last are called *potential* cauteries. Boiling water is actually hot; brandy, producing heat in the body, is potentially hot, though of itself cold.

ACTUAL SIN, that which is committed by the person himself, in opposition to original sin, or that which he contracted from being a child of Adam.

ACTUARIE NAVES, a kind of ships among the Romans, chiefly designed for swift sailing.

ACTUARIUS, a celebrated Greek physician, of the 13th century, and the first Greek author who has treated of mild purgatives, such as cassia, manna, fena, &c. His works were printed in one volume folio, by Henry Stephens, in 1567.

ACTUARIUS, or **ACTARIUS**, a notary or officer appointed to write the acts or proceedings of a court, or the like. In the Eastern Empire, the actuarii were properly officers who kept the military accounts, received the corn from the *suscipitores* or store-keepers, and delivered it to the soldiers.

ACTUATE, to bring into act, to put a thing in motion, or to stir up a person to action.

ACTUS, in ancient architecture, a measure in length equal to 120 Roman feet. In ancient agriculture, the word signified the length of one furrow, or the distance a plough goes before it turns.

ACTUS MINIMUS, was a quantity of land 120 feet in length, and four in breadth.

ACTUS MAJOR, or **ACTUS QUADRATUS**, a piece of ground in a square form, whose side was equal to 120 feet, equal to half the jugerum.

ACTUS INTERVICENALIS, a space of ground four feet in breadth, left between the lands as a path or way.

ACULEATE, or **ACULEATI**, a term applied to any plant or animal armed with prickles.

ACULEI, the prickles of animals or of plants.

ACULER, in the menage, is used for the motion of a horse, when, in working upon volts, he does not go far enough forward at every time or motion, so that his shoulders embrace or take in too little ground, and his croupe comes too near the center of the volt. Horses are naturally inclined to this fault in making demi-volts.

ACUMINA, in antiquity, a kind of military omen, most generally supposed to have been taken from the points or edges of darts, swords, or other weapons.

ACUPUNCTURE, the name of a surgical operation among the Chinese and Japanese, which is performed by pricking the part affected with a silver needle. They employ this operation in head-achs, lethargies, convulsions, colics, &c.

ACUNA (Christophoro de), a Spanish Jesuit, born at Burgos. He was admitted into the society in 1612, being then but 15 years of age. After having devoted some years to study, he went to America, where he assisted in making converts in Chili and Peru. In 1640, he returned to Spain, and gave the king an account how far he had succeeded in the commission he had received to make discoveries on the river of the Amazons; and the year following he published a description of this river, at Madrid. Acuna was sent to Rome, as procurator of his province. He returned to Spain with the title of Qualificator of the Inquisition; but soon after embarked again for the West Indies, and was at Lima in 1675, when father Southwell published at Rome the Bibliothéque of the Jesuit writers. Acuna's work is intitled, *Nuevo descubrimiento del gran rio de las Amazonas; i. e.* "A new discovery of the great river of the Amazons." He was ten months together upon this river, having had instructions to inquire into every thing with the greatest exactness, that his majesty might thereby be enabled to render the navigation more easy and commodious. He went aboard a ship at Quito with Peter Texeira, who had already been so far up the river, and was therefore thought a proper person to accompany him in this expedition. They embarked in February 1639, but did not arrive at Para till the December following. It is thought that the revolutions of Portugal, by which the Spaniards lost all Brazil, and the colony of Para at the mouth of the river of the Amazons, were the cause that the relation of this Jesuit was suppressed; for as it could not be of any advantage to the Spaniards, they were afraid it might prove of great service to the Portuguese. The copies of this work became extremely scarce, so that the publishers of the French translation at Paris asserted, that there was not one copy of the original extant, excepting one in the

the possession of the translator, and, perhaps, that in the Vatican library. M. de Gomberville was the author of this translation: it was published after his death, with a long dissertation. An account of the original may be seen in the *Paris Journal*, in that of Leipsic, and in Chevreau's *History of the World*.

ACUS, in ichthyology, the trivial name of a species of *syngnathus*. See *SYNGNATHUS*.

ACUTE, an epithet applied to such things as terminate in a sharp point or edge. And in this sense it stands opposed to obtuse.

ACUTE *Angle*, in geometry, is that which is less than a right angle.

ACUTE-ANGLED *Triangle*, is a triangle whose three angles are all acute.

ACUTE-ANGLED *Cone* is, according to the ancients, a right cone, whose axis makes an acute angle with its side.

ACUTE, in music, is applied to a sound or tone that is sharp or high, in comparison of some other tone. In this sense, *acute* stands opposed to *grave*.

ACUTE *Accent*. See *ACCENT*.

ACUTE *Diseases*, such as come suddenly to a crisis. This term is used for all diseases which do not fall under the head of chronic diseases.

AD, a Latin preposition, originally signifying *to*, and frequently used in composition both with and without the *d*, to express the relation of one thing to another.

AD *Bestias*, in antiquity, is the punishment of criminals condemned to be thrown to wild beasts.

AD *Hominem*, in logic, a kind of argument drawn from the principles or prejudices of those with whom we argue.

AD *Ludos*, in antiquity, a sentence upon criminals among the Romans, whereby they were condemned to entertain the people by fighting either with wild beasts, or with one another, and thus executing justice upon themselves.

AD *Metalla*, in antiquity, the punishment of such criminals as were condemned to the mines, among the Romans; and therefore called *Metallici*.

AD *Valorem*, a term chiefly used in speaking of the duties or customs paid for certain goods: The duties on some articles are paid by the number, weight, measure, tale, &c. and others are paid *ad valorem*, that is, according to their value.

ADAGE, a proverb, or short sentence, containing some wise observation or popular saying. Erasmus has made a very large and valuable collection of the Greek and Roman adages; and Mr Ray has done the same with regard to the English. We have also Kelly's collection of Scotch Proverbs.

ADAGIO, in music, an Italian adverb, signifying *slowly, leisurely*; and is used to denote the slowest of all times, except the grave.

ADAM, the first of the human race, was formed by the Almighty on the sixth day of the creation. His body was made of the dust of the earth; after which, God animated or gave it life, and Adam then became a rational creature.—His heavenly Parent did not leave his offspring in a destitute state to shift for himself; but planted a garden, in which he caused to grow not only every tree that was proper for producing food, but likewise such as were agreeable to the eye, or merely ornamental. In this garden were assembled all the brute creation; and, by

their Maker, caused to pass before Adam, who gave all of them names, which were judged proper by the Deity himself.—In this review, Adam found none for a companion to himself. This solitary state was seen by the Deity to be attended with some degree of unhappiness; and therefore he threw Adam into a deep sleep, in which state he took a rib from his side, and healing up the wound, formed a woman of the rib he had taken out. On Adam's awaking, the woman was brought to him; and he immediately knew her to be one of his own species, called her his bone and his flesh, giving her the name of *woman* because she was taken out of man.

The first pair being thus created, God gave them authority over the inferior creation, commanding them to subdue the earth, also to increase and multiply, and fill it. They were informed of the proper food for the beasts and for them; the grass, or green herbs, being appointed for beasts; and fruits, or seeds, for man. Their proper employment also was assigned them; namely, *to dress the garden, and to keep it*.

Though Adam was thus highly favoured and instructed by his Maker, there was a single tree, which grew in the middle of the garden, of the fruit of which they were not allowed to eat; being told, that they should surely die in the day they eat of it. This tree was named, The tree of the knowledge of good and evil. This prohibition, however, they soon broke through. The woman having entered into conversation with the *serpent*, was by him persuaded, that by eating of the tree she should become as wise as God himself; and accordingly, being invited by the beauty of the fruit, and its desirable property of imparting wisdom, she plucked the fruit, and eat it; giving her husband of it at the same time, who did likewise eat.

Before this transgression of the divine command, Adam and his wife had no occasion for clothes, neither had they any sense of shame; but immediately on eating the forbidden fruit, they were ashamed of being naked, and made aprons of fig-leaves for themselves. On hearing the voice of God in the garden, they were terrified, and hid themselves: but being questioned by the Deity, they confessed what they had done, and received sentence accordingly; the man being condemned to labour; the woman to subjection to her husband, and to pain in childbearing. They were now driven out of the garden, and their access to it prevented by a terrible apparition. They had clothes given them by the Deity made of the skins of beasts. In this state Adam had several children; the names of only three of whom we are acquainted with, *viz.* Cain, Abel, and Seth. He died at the age of 930 years.

These are all the particulars concerning Adam's life, that we have on divine authority: but a vast multitude of others are added by the Jews, Mahometans, and Papists; all of which must be at best conjectural; most of them, indeed, appear downright falsehoods or absurdities. Mr Bayle, however, and the authors of the *General Dictionary*, have been at great pains in collecting them, and the account spreads over many folio pages; but our readers curiosity, it is presumed, will be sufficiently gratified by the few which are here subjoined.

According to the Talmudists, when Adam was created,

Adam.

created, his body was of immense magnitude. When he sinned, his stature was reduced to an hundred ells, according to fume; to nine hundred cubits, according to others; who think this was done at the request of the angels, who were afraid of so gigantic a creature. In the island of Ceylon is a mountain, called the *Peak* or mountain of Adam, from its being, according to the tradition of the country, the residence of our first parent. Here the print of his footsteps, above two palms in length, are still pointed out.

Many reveries have been formed concerning the personal beauty of Adam. That he was a handsome well-shaped man, is probable; but some writers, not content with this, affirm, that God, intending to create man, clothed Himself with a perfectly beautiful human body, making this his model in the formation of the body of Adam.

Nor has the imagination been less indulged concerning the formation of the human species male and female.—It would be endless to recount all the whimsies that have been wrote on this subject; but as Mrs Bourignon has made a considerable figure in the *religieux*, or rather *superstitious* world, we cannot help inserting some of her opinions concerning the first man, which are peculiarly marvellous. According to the *revelations* of this lady, Adam before his fall possessed in himself the principles of both sexes, and the virtue or power of producing his like, without the concurrent assistance of woman. The division into two sexes, the imagined †, was a consequence of man's sin; and now, the observes, mankind are become so many *monsters in nature*, being much less perfect in this respect than plants or trees, who are capable of producing their like alone, and without pain or misery. She even imagined ‡, that, being in an ecstasy, she saw the figure of Adam before he fell, with the manner how, by himself, he was capable of procreating other men. "God," says she, "repented to my mind the beauty of the first world, and the manner how he had drawn it from the chaos: every thing was bright, transparent, and darted forth light and ineffable glory. The body of Adam was pure and more transparent than crystal, and vastly fleet; through this body were seen vessels and rivulets of light, which penetrated from the inward to the outward parts, through all his pores. In some vessels ran fluids of all kinds and colours, vastly bright, and quite diaphanous. The most ravishing harmony arose from every motion; and nothing resisted, or could annoy, him. His stature was taller than the present race of men; his hair was short, curled, and of a colour inclining to black; his upper lip covered with short hair: and instead of the bectial parts which modesty will not allow us to name, he was fashioned as our bodies shall be in the life eternal, which I know not whether I dare reveal. In that *region* * his nose was formed after the manner of a *face*, which diffused the most delicious fragrancy and perfumes; whence also men were to issue, all whose principles were inherent in him; there being in his belly a vessel, where little eggs were formed; and a second vessel filled with a fluid, which impregnated those eggs: and when man heated himself in the love of God, the desire he had that other creatures should exist besides himself, to praise and love God, caused the fluid abovementioned (by means of the fire of the love of God) to drop on one or more of these

eggs, with inexpressible delight; which being thus impregnated, issued, some time after, out of man, by this canal †, in the shape of an egg, whence a perfect man was hatched by insensible degrees. Woman was formed by taking out of Adam's sides the vessels that contained the eggs; which she still possesses, as is discovered by anatomists."

Many others have believed, that Adam at his first creation was both male and female: others, that he had two bodies joining together at the shoulders, and their faces looking opposite ways like those of Janus. Hence, say these, when God created Eve, he had no more to do than to separate the two bodies from one another*. Of all others, however, the opinion of Paracelsus seems the most ridiculous †. *Negabat primos parentes ante lapsum habuisse partes generationis hominis necessariar; credebant pelsa accessisse, ut strumam gutturi.*

Extravagant things are asserted concerning Adam's knowledge. It is very probable that he was instructed by the Deity how to accomplish the work appointed him, viz. to dress the garden, and keep it from being destroyed by the brute creatures; and it is also probable that he had likewise every piece of knowledge communicated to him that was either necessary or pleasing: but that he was acquainted with geometry, mathematics, rhetoric, poetry, painting, sculpture, &c. is too ridiculous to be credited by any sober person. Some rabbies, indeed, have contented themselves with equaling Adam's knowledge to that of Moses and Solomon; while others, again, have maintained that he excelled the angels themselves. Several Christians seem to be little behind these Jews in the degree of knowledge they ascribe to Adam; nothing being hid from him, according to them, except contingent events relating to futurity. One writer indeed (Pinedo) excepts politics; but a Carthusian friar, having exhausted, in favour of Aristotle, every image and comparison he could think of, at last asserted that Aristotle's knowledge was as extensive as that of Adam.—In consequence of this surprising knowledge with which Adam was endued, he is supposed to have been a considerable author. The Jews pretend that he wrote a book on the creation, and another on the Deity. Some rabbies ascribe the 92^d psalm to Adam; and in some manuscripts the Chaldee title of this psalm expressly declares that this is the song of praise which the first man repeated for the sabbath-day.

Various conjectures have been formed concerning the place where man was first created, and where the garden of Eden was situated; but none of these have any solid foundation. The Jews tell us, that Eden was separated from the rest of the world by the ocean; and that Adam, being banished therefrom, walked across the sea, which he found every way fordable, by reason of his enormous stature*. The Arabians imagined paradise to have been in the air, and that our first parents were thrown down from it on their transgression, as Vulcan is said to have been thrown down headlong from heaven by Jupiter.

Strange stories are told concerning Adam's children. That he had none in the state of innocence, is certain from scripture; that his marriage with Eve was not consummated till after the fall, cannot be proved from thence. Some imagine, that, for many years after the fall, Adam denied himself the connubial joys by way of penance; others, that he cohabited with another woman.

Adam.

i. e. the nasal canal, situated as above described.

* See Androgynæ.

† Paracelsus apud Vossium de philosophia, c. ix. p. 77.

† Preface to a book entitled, *Le monde en lui-même et la nouvelle terre*, Amst. 1769.

‡ *Vie continue de M. de Bourignon*, p. 35.

* Viz. of the bectial parts, (we suppose.)

* This is just the picture of the Orion or P. lyphemus of the poets. *Metrid. lib. 661, 664, & 763.*

Adam
Melchior)
||
Adam.

man. The Mahometans tell us, that our first parents having been thrown headlong from the celestial paradise, Adam fell upon the isle of Serendib, or Ceylon, in the East Indies; and Eve on Iodda, a port of the Red Sea, not far from Mecca. After a separation of upwards of 200 years, they met in Ceylon, where they multiplied: according to some Eve had twenty, according to others only eight, deliveries; bringing forth at each time twins, a male and a female, who afterwards married. The Rabbins, imagine that Eve brought forth Cain and Abel at a birth; that Adam wept for Abel an hundred years in the valley of tears near Hebron, during which time he did not cohabit with his wife; and that this separation would probably have continued longer, had it not been forbid by the angel Gabriel. The inhabitants of Ceylon affirm, that the salt lake on the mountain of Colombo consists wholly of the tears which Eve for one hundred years together shed because of Abel's death.

Some of the Arabians tell us, that Adam was buried near Mecca on mount Abukobeis; others, that Noah, having laid his body in the ark, caused it to be carried after the deluge to Jerusalem by Melchisedek the son of Shem: of this opinion are the Eastern Christians; but the Persians affirm that he was interred in the isle of Serendib, where his corps was guarded by lions at the time the giants warred upon one another.—St Jerom imagined that Adam was buried at Hebron; others, on mount Calvary. Some are of opinion that he died on the very spot where Jerusalem was afterwards built; and was buried on the place where Christ suffered, that so his bones might be sprinkled with the Saviour's blood!!!

ADAM (Melchior) lived in the 17th century. He was born in the territory of Grotkav in Silesia, and educated in the college of Brieg, where the dukes of that name, to the utmost of their power, encouraged learning and the reformed religion as professed by Calvin. Here he became a firm Protestant, and was enabled to pursue his studies by the liberality of a person of quality, who had left several exhibitions for young students. He was appointed rector of a college at Heidelberg, where he published his first volume of illustrious men in the year 1615. This volume, which consisted of philosophers, poets, writers on polite literature, and historians, &c. was followed by three others; that which treated of divines was printed in 1619; that of the lawyers came next; and, finally, that of the physicians: the two last were published in 1620. All the learned men, whose lives are contained in these four volumes, lived in the 16th, or beginning of the 17th century, and are either Germans or Flemings; but he published in 1618 the lives of twenty divines of other countries in a separate volume. All his divines are Protestants. The Lutherans were not pleased with him, for they thought him partial; nor will they allow his work to be a proper standard, whereby to judge of the learning of Germany. He wrote other works besides his lives, and died in 1622.

ADAM'S Apple. See AURANTUM.

ADAM'S Needle. See YUCCA.

ADAM'S Peak, a high mountain of the East Indies, in the island of Ceylon, on the top of which they believe the first man was created. See ADAM.

ADAM or ADOM, a town in the Perzia, or on the o-

ther side the Jordan, over-against Jericho, where the Jordan began to be dried up on the passage of the Israelites; (Joshua.)

ADAMA, or ADMAH, one of the towns that were involved in the destruction of Sodom; (Moses).

ADAMANT, a name sometimes given to the diamond*. It is likewise applied to the scoriae of gold, the magnet, &c.

* See Diamond.

ADAMIC EARTH, a name given to common red clay, alluding to that species of earth of which the first man is supposed to have been made.

ADAMITES, in ecclesiastical history, the name of a sect of ancient heretics, supposed to have been a branch of the Basilidians and Carpocratians.

Epiphanius tells us, that they were called Adamites from their pretending to be re-established in the state of innocence, and to be such as Adam was at the moment of his creation, whence they ought to imitate him in his nakedness. They detested marriage; maintaining, that the conjugal union would never have taken place upon earth had sin been unknown; and that the privilege of enjoying women in common, was one of the rights which flowed from their establishment in original purity.

This obscure and detestable sect did not at first last long; but it was revived in the twelfth century by one Tandamus, since known by the name of *Tanchelin*, who propagated his errors at Antwerp, in the reign of the emperor Henry V. He maintained, that there ought to be no distinction between priests and laymen, and that fornication and adultery were meritorious actions. Tanchelin had a great number of followers, and was constantly attended by 3000 of these profligates in arms. His sect did not however continue long after his death: but another appeared under the name of *Turlupins*, in Savoy and Dauphiny, where they committed the most brutal actions in open day.

About the beginning of the fifteenth century, one Picard, a native of Flanders, spread these errors in Germany and Bohemia, particularly in the army of the famous Zisca, notwithstanding the severe discipline he maintained. Picard pretended that he was sent into the world as a new Adam, to re-establish the law of nature; and which, according to him, consisted in exposing every part of the body, and having all the women in common. This sect found also some partizans in Poland, Holland, and England: they assembled in the night; and it is asserted, that one of the fundamental maxims of their society was contained in the following verse:

Jura, perjura, secretum prodere noli.

ADAMSHIDE, a district of the circle of Rastenburg, belonging to the king of Prussia, which, with Dombroeken, was bought, in 1737, for 42,000 dollars.

ADAMSON (Patrick), a Scottish prelate, archbishop of St Andrews. He was born in the year 1536, in the town of Perth, where he received the rudiments of his education; and afterwards studied Philosophy, and took his degree of master of arts at the university of St Andrews. In the year 1566, he set out for Paris, as tutor to a young gentleman. In the month of June of the same year, Mary queen of Scots being delivered of a son, afterwards James VI. of Scotland, and First of England, Mr Adamson wrote a Latin poem on the occasion. This proof of his loyalty involved him.

Adama
||
Adamson.

E X H I B I T I N G

NOUNS, properly so called, being the NAMES OF ALL THOSE THINGS WHICH EXIST, or are CONCEIVED TO EXIST. They may be divided into three kinds, each of which admits of the subdivisions after mentioned, viz.

NATURAL, or those which are used as the NAMES OF NATURAL SUBSTANCES; such are

ARTIFICIAL, or the several names of ARTIFICIAL OBJECTS; such as,

ABSTRACT, or those which are the names of QUALITIES considered as ABSTRACTED FROM THEIR SUBSTANCES; such as,

ANIMAL, { **MAN**,
 { **DOG**,
 { **ALEXANDER**, **CYRUS**, &c.
 { **CERBERUS**, **ARGUS**, &c.

EDIFICE, { **HOUSE**,
 { **CHURCH**,
 { **THE VATICAN**, &c.
 { **ST PAUL'S**, &c.

MOTION. { **FLIGHT**,
 { **COURSE**.
 { **THE FALCON'S FLIGHT**, &c.
 { **THE GRE-HOUND'S COURSE**, &c.

GENUS. { **INDIVIDUAL**,
 { **SPECIES**,
 { **MAN**,
 { **DOG**,
 { **ALEXANDER**, **CYRUS**, &c.
 { **CERBERUS**, **ARGUS**, &c.

VERBS, or those words which are expressive of an ATTRIBUTE and an ASSERTION; as, I WRITE. They all admit of the variations after mentioned.

PREPOSITIVE; so called because they are capable of LEADING A SENTENCE. They are divided into three orders, called the pronouns of the

PRONOUNS, which are a species of nouns invented to SUPPLY THE PLACE OF NOUNS IN CERTAIN CIRCUMSTANCES. They are of two kinds, viz.

SUBJUNCTIVE; so called, because it cannot lead a sentence, but only serves to subjoin a clause to another which was previous. Of this kind are

FIRST PERSON; in English, *I*. This pronoun denotes the SPEAKER as CHARACTERIZED BY THE PRESENT ACT OF SPEAKING, in contradistinction to every other character which he may bear. It is said to be of the FIRST PERSON, because there must necessarily be a speaker before there can be a hearer; and the speaker and hearer are the only persons employed in discourse.

SECOND PERSON,—*THOU*. This pronoun denotes, THE PERSON ADDRESSED AS CHARACTERIZED BY THE PRESENT CIRCUMSTANCE OF BEING ADDRESSED, in contradistinction, &c. It is said to be of the SECOND PERSON, because in discourse there cannot be a hearer till there be a speaker. The pronouns of the first and second persons have number and cases, for the same reason that nouns have these accidents; but in no language have they any variation denoting gender: the reason is, that SEX, and all other properties and attributes whatever, except those just mentioned as descriptive of the nature of these pronouns, are foreign from the mind of the speaker when he utters *I* or *THOU* in discourse.

THIRD PERSON,—*HE, SHE, IT*; which words are employed to denote any OBJECT which may be the subject of discourse different from the speaker and the hearer. They are improperly said to be of any person; for there can be but two persons employed in discourse, the speaker and the party addressed. They are, however, PRONOUNS; since they stand by themselves, and are the substitutes of NOUNS. *HE* is the substitute of a noun denoting a male animal; *SHE*, of a noun denoting a female animal; and *IT*, of a noun denoting an object which has no sex. All these, like the pronouns personal, admit of NUMBER and CASES; but there is this peculiarity attending them, that though in every case of the singular number the distinction of gender is carefully preserved, in the plural it is totally lost; *THEY, THEIRS*, and *THEIR*, being the nominative, possessive, and accusative, cases of *HE, OF SHE*, and of *IT*.

WHICH and **WHO**. This subjunctive pronoun may be substituted in the place of any noun whatever, whether it be expressive of a genus, a species, or an individual; as the animal which, the man who, Alexander who, &c. Nay, it may even become the substitute of the personal pronouns themselves; as when we say, *I who now write, you who now read, thou who readest, he who writes, she who spoke*; where it is observable, that the subjunctive who adopts the PERSON of that prepositive pronoun which it represents, and affects the verb accordingly. *Who* and *which* therefore are real pronouns from substitution; and they have this peculiarity besides, that they have not only the power of a pronoun, but also of a connective of the same import with that which in English is expressed by the preposition *or*. The word *that* is now used indifferently for *who* or *which*, as a subjunctive pronoun; but it was originally used only as a definitive, and as such it ought still to be considered in philosophical grammar.

THE PRESENT, which represents the action of the verb as going on, and as contemporary with something else; as, *I write*, or *I am writing*, either just now, or when you are reading, &c.

THE PRÆTER-IMPERFECT, which represents the action of the verb as having been going on but not finished in some portion of past time; as, *I was writing*, no matter when, yesterday, last week, or last year.

THE AORIST OF THE PAST, which represents the action of the verb as finished in some indefinite portion of past time; as *I wrote*, or *did write*, yesterday, last week, &c.

THE PRÆTER-PERFECT, which represents the action of the verb as just now finished, or as finished in some portion of time, within which the present instant is comprehended; as *I have written this day or this week*.

THE PLUSQUAM-PERFECT, which represents the action of the verb as having been finished in some portion of time, within which a determinate past instant was comprehended; as, *I had written last week before I saw you*.

THE FIRST FUTURE, which represents the action of the verb as to be going on at some indefinite future time; as *I shall write or be writing to-morrow, next week, &c.*

THE SECOND FUTURE, which represents the action of the verb as to be completed at some definite future time; as, *I shall have written when you come to-morrow, next week, &c.*

PARTICIPLES, or those words which are expressive of an ATTRIBUTE combined with TIME. In English there are only two participles: the present, as *writing*, which expresses the action of the verb to write, as going on; and the past, as *written*, which expresses the action of the same verb as finished, and therefore past in time. In Greek and Latin there is a future participle, by which the attribute is represented as to be in a state of exertion at some future time; as, *scripturus*, "about to write."

ADJECTIVES, or those words which express as inhering in their substances the several QUALITIES of things, of which the essence consists not in motion or its privation; as, *good, bad, black, white, large, small*, &c. As attributes are the same whether they belong to males or females, to one object or to many, adjectives ought in strictness to admit of no variation respecting sex or number; and in English they actually admit of none. Some qualities, however, are of such a nature, that one substance may have them in a greater degree than another; and therefore the adjectives denoting these qualities admit in most languages of a variation, which grammarians call the degrees of comparison. Thus *Plato was wise, Socrates was wiser than he, but Solomon was the wisest of men*. There is a species of adjectives derived from nouns, and even from pronouns: for we say, *the Pompeian party, a brazen trumpet, and my book*; which are phrases equivalent to *the party of Pompey, a trumpet of brass, and the book of me*.

ADVERBS, or those words which, as they denote the ATTRIBUTES OF ATTRIBUTES, have been called ATTRIBUTES OF THE SECOND ORDER; to distinguish them from VERBS, PARTICIPLES, and ADJECTIVES, which denote the ATTRIBUTES OF SUBSTANCES, and are therefore called ATTRIBUTES OF THE FIRST ORDER. ADVERBS are divided into two kinds, viz.

I. Those that are common to ALL ATTRIBUTES OF THE FIRST ORDER; i. e. which coalesce equally with VERBS, with PARTICIPLES, and with ADJECTIVES. These may be divided into ADVERBS

OF INTENSION and **REMISSION**, or of **QUANTITY CONTINUOUS**; as, *moderately, vastly, exceedingly*, &c. These, like adjectives of a similar nature, admit of the different degrees of comparison.

OF QUANTITY DISCRETE; as, *once, twice, thrice*, &c. These are not, in strictness of speech, adverbs, being in reality the POSSESSIVE CASES of ONE, TWO, THREE, &c.

OF RELATION; as, *more, most, less, least, equally, proportionally*, &c.

OF TIME; as, *then, when, afterward, now*, &c.

OF PLACE; as *here, there, where, hence, whence*, &c. As also adverbs derived from prepositions; as, *upward, downward*, &c.

OF INTENSIONS and **REMISSIONS PECULIAR TO MOTION**; as, *speedily, hastily, slowly*, &c.—We have given ADVERBS a place among the parts of speech necessary for the communication of thought; but it may be doubted whether they be intitled to this distinction. English adverbs at least seem to be nothing more than corruptions of nouns, adjectives, and verbs. See Chap. V. sect. 3.

II. Those that are confined to VERBS properly so called, and which are of the following kinds:

A or **AN**, which is prefixed to a noun or general term, to denote that but ONE INDIVIDUAL is meant of that genus or species of which the noun is the common name. This article, however, leaves the individual itself quite indeterminate. Thus *man* is the general name of the whole human race; *a man* is one individual, but that individual is unknown.

ANY; which is prefixed to a noun either in the singular or plural number, when it is indifferently as to the truth of the proposition what individual or individuals be supposed: Thus, "any man will be virtuous when temptation is away."

SOME; which is prefixed to nouns in the plural number, to denote that only PART of the species or genus is meant, leaving that part undetermined: Thus, "some men are great cowards."

THE; which is prefixed to a noun, to denote one individual of the species of which something is predicated that distinguishes it from every other individual: Thus, "the man that hath not music in himself is fit for treason." It is used before nouns in both numbers and for the same purpose; for we may say, "the men who have not music in themselves are fit for treasons."

THIS; which prefixed to a noun in the singular number, denotes an individual as PRESENT and NEAR AT HAND; as, "this man hide me."

THAT; which prefixed to a noun in the singular number, denotes an individual as PRESENT but at a LITTLE DISTANCE; as, "that man in the corner." These two articles have plurals: THESE is the plural of THIS, and THOSE the plural of THAT. There are many other articles both definite and indefinite; for which, see Chap. II.

CONJUNCTIONS, or those words which conjoin sentences and their meanings also; and

DISJUNCTIVES, or those words which, at the same time that they conjoin sentences, disjoin their meanings. Each of these general divisions has been again subdivided. The former into COPULATIVES and CONTINUATIVES, the latter into SIMPLE DISJUNCTIVES and ADVERSATIVE DISJUNCTIVES. But the general division is absurd, and the subdivisions are useless. CONJUNCTIONS never disjoin the meanings of sentences, nor have any other effect than to combine two or more simple sentences into one compound sentence. If those simple sentences be of opposite meanings before their combination, they will continue so after it, whatever conjunction be employed to unite them. In nature, DIFFERENT TRUTHS are connected, if they be connected at all, by DIFFERENT RELATIONS; and therefore when the SENTENCES expressive of those truths are connected in language, it must be by words significant of those NATURAL RELATIONS. Thus,

CONJUNCTIONS; by which name are distinguished all those CONNECTIVES WHICH ARE COMMONLY EMPLOYED TO CONJOIN SENTENCES. These have been divided into two kinds, called

PREPOSITIONS, or those CONNECTIVES of which the COMMON OFFICE IS TO CONJOIN WORDS WHICH REFUSE TO COALESCE; and this they can do only by SIGNIFYING THOSE RELATIONS BY WHICH THE THINGS EXPRESSED BY THE UNITED WORDS ARE CONNECTED IN NATURE. The first words of men, like their first ideas, had an immediate reference to sensible objects; and therefore there can be no doubt but the original use of PREPOSITIONS was to denote the various relations of body. Afterwards when men began to discern with their intellects, they took those words which they found already made, PREPOSITIONS as well as others, and transferred them by metaphor to intellectual conceptions. PREPOSITIONS therefore are either

PROPER, or those which literally denote the relations subsisting among the objects of sense. Such as

Or

METAPHORICAL. For as those who are above others in place have generally the advantage over them, the PREPOSITIONS which denote the one kind of superiority or inferiority, are likewise employed to denote the other. Thus we say of a king, "he ruled over his people;" and of a soldier, "he served under such a general."

ACCIDENTAL ADDITION is expressed by the conjunction *and*; as when we say, "Lyfippus was a statuary and Priscian was a grammarian."

THE UNEXPECTED JUNCTION OF CONTRARY TRUTHS is expressed by *but*; as, "Brutus was a patriot but Cæsar was not."

THE RELATION OF AN EFFECT TO ITS CAUSE is expressed by *because*; as, "Rome was enslaved because Cæsar was ambitious."

THE RELATION OF AN EFFECT TO A CAUSE OF WHICH THE EXISTENCE IS DOUBTFUL, by *if*; as, "you will live happily if you live honestly."

THE RELATION OF A CAUSE TO ITS EFFECT, by *therefore*; as, "Cæsar was ambitious therefore Rome was enslaved."</



Adamson
(Patrick.)

him in some difficulties, having been confined in France for six months; nor would he have got off easily, had not queen Mary, and some of the principal nobility, interested themselves in his behalf. As soon as he recovered his liberty, he retired with his pupil to Bourges. He was in this city during the massacre at Paris; and the same bloody persecuting spirit prevailing among the catholics at Bourges, as at the metropolis, he lived concealed for seven months in a public house, the master of which, upwards of seventy years of age, was thrown from the top thereof, and had his brains dashed out, for his charity to heretics. Whilst Mr Adamson lay thus in his sepulchre, as he called it, he wrote his Latin poetical version of the Book of Job, and his Tragedy of Herod in the same language. In the year 1573, he returned to Scotland; and, having entered into holy orders, became minister of Paisley. In the year 1575, he was appointed one of the commissioners, by the general assembly, to settle the jurisdiction and policy of the church; and the following year he was named, with Mr David Lindsay, to report their proceedings to the earl of Mortoun, then regent. About this time, the earl made him one of his chaplains; and, on the death of bishop Douglas, promoted him to the archiepiscopal see of St Andrews, a dignity which brought upon him great trouble and uneasiness: for now the clamour of the Presbyterian party rose very high against him, and many inconsistent absurd stories were propagated concerning him. Soon after his promotion, he published his catechism in Latin verse, a work highly approved even by his enemies; but, nevertheless, they still continued to persecute him with great violence. In 1578, he submitted himself to the general assembly, which procured him peace but for a very little time; for, the year following, they brought fresh accusations against him. In the year 1582, being attacked with a grievous disease, in which the physicians could give him no relief, he happened to take a simple medicine from an old woman, which did him service. The woman, whose name was Alison Pearson, was thereupon charged with witchcraft, and committed to prison, but escaped out of her confinement; however, about four years afterwards, she was again found and burnt for a witch. In 1583, king James came to St Andrews; and the archbishop, being much recovered, preached before him, and disputed with Mr Andrew Melvil, in presence of his majesty, with great reputation, which drew upon him fresh calumny and persecution. The king, however, was so well pleased with him, that he sent him ambassador to queen Elizabeth, at whose court he resided for some years. His conduct, during his embassy, has been variously reported by different authors. Two things he principally laboured, *viz.* the recommending the king his master to the nobility and gentry of England, and the procuring some support for the episcopal party in Scotland. By his eloquent preaching, he drew after him such crowds of people, and raised in their minds such a high idea of the young king his master, that queen Elizabeth forbade him to enter the pulpit during his stay in her dominions. In 1584, he was recalled, and sat in the parliament held in August at Edinburgh. The Presbyterian party was still very violent against the archbishop. A provincial synod was held at St Andrews in April 1586: the archbishop was here accused and

excommunicated: he appealed to the king and the States, but this availed him little; for the mob being excited against him, he durst scarce appear in public. At the next general assembly, a paper being produced, containing the archbishop's submision, he was absolved from the excommunication. In 1588, fresh accusations were brought against him. The year following, he published the Lamentations of the prophet Jeremiah in Latin verse; which he dedicated to the king, complaining of his hard usage. In the latter end of the same year, he published a translation of the Apocalypse, in Latin verse; and a copy of Latin verses, addressed also to his majesty, when he was in great distress. The king, however, was so far from giving him assistance, that he granted the revenue of his see to the duke of Lennox; so that the remaining part of this prelate's life was very wretched, he having hardly subsistence for his family. He died in 1591.

ADANA, a town of Asia, in Natolia, and in the province of Carmania. It is seated on the river Choquen; on the banks of which stands a strong little castle built on a rock. It has great numbers of beautiful fountains brought from the river by means of water-works. Over the river there is a stately bridge of fifteen arches, which leads to the water-works. The climate is very pleasant and healthy, and the winter mild and serene: but the summer is so hot as to oblige the principal inhabitants to retire into the neighbouring mountains, where they spend six months among shady trees and grottoes, in a most delicious manner. The adjacent country is rich and fertile, and produces melons, cucumbers, pomegranates, pulse, and herbs of all sorts, all the year round; besides corn, wine, and fruits in their proper season. It is thirty miles east of Tarsus, on the road to Aleppo. E. long. 35. 42. N. lat. 38. 10.

ADANSONIA, ETHIOPIAN SOUR-GOURD, or MONKIES-BREAD; a genus of the monodelphia order, belonging to the polyandria class of plants. It has its name from oſe Mr Adanson, a French furgeon, who brought a curious collection of plants and seeds from Senegal in Africa.

Species. We know but of one species belonging to this genus at present. It is a native of Africa and South America. The leaves of the young plants are entire, of an oblong form, about four or five inches long, and almost three broad towards the top, having several veins running from the middle rib; they are of a lucid green colour. As the plants advance in height, the leaves alter, and are divided into three parts, and afterwards into five lobes, which spread out in the shape of an hand. The fruit is almost as large as a man's head, the shell woody and close, having a greenish downy coat; it is divided into 10, 12, or 14 cells within, which contain a good number of kidney-shaped seeds, as large as the tip of a man's little finger; these are closely surrounded with a mealy pulp of an acid taste.

—According to Mr Adanson's account, these trees grow in plains of barren moveable sand, which being continually shifted by the wind, admit of no tracts whereby the traveller can be guided over them. The size of the trunks, roots, and branches, is very surprising, their circumference being sometimes 65 or 70 feet, but their height only from 8 to 12. These trunks were divided into many horizontal branches, which touched the ground at their extremities; these

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were from 45 to 55 feet long, and so large in circumference that each branch was equal to a monitrous tree in Europe; and where the water of a neighbouring river had washed away the earth so as to leave the roots of one of these trees bare and open to sight, they measured 110 feet in length, without including those parts which remained covered with sand.

Culture. This tree is propagated from seeds, which are brought from the countries where they grow naturally. Being natives only of hot climates, the plants will not thrive in the open air in Britain, even in summer. The seeds are therefore to be sown in pots, and plunged into a hot-bed, where the plants will appear in about six weeks, and in a short time after be fit to transplant. They must then be planted each in a separate pot, in light sandy earth, and plunged into a hot-bed, shading them until they have taken root: after which they should have fresh air admitted every day in warm weather; but must be sparingly watered, as being apt to rot. They grow quickly for two or three years, but afterwards make little progress; the lower part of the stem then begins to swell, and put out lateral branches, inclining to a horizontal position, and covered with a light grey bark.—Some of this kind of plants were raised from seeds obtained from Grand Cairo by Dr William Sherard, in 1724, and were grown to the height of 18 feet; but were all destroyed by the severe frost in 1740; after which they were unknown in Britain till the return of Mr Adanson to Paris in 1754.

ADAPTERS, or ADOPTERS. See **CHEMISTRY**, n° 80.

ADAR, the name of a Hebrew month, answering to the end of February and beginning of March, the 12th of their sacred, and 6th of their civil year. On the 7th day of it, the Jews keep a feast for the death of Moses; on the 13th, they have the feast of Easter; and on the 14th, they celebrate the feast of Purim, for their deliverance from Haman's conspiracy.—As the lunar year, which the Jews followed in their calculations, is shorter than the solar, by about 11 days, which at the end of three years make a month, they then intercalate a 13th month, which they call *Veader*, or the *second Adar*.

ADARCE, a kind of concreted salts found on reeds and other vegetables, and applied by the ancients as a remedy in several cutaneous diseases.

ADARCON, in Jewish antiquity, a gold coin mentioned in scripture, worth about 15 s. sterling.

ADARME, in commerce, a small weight in Spain, which is also used at Buenos-Aires, and in all Spanish America. It is the 16th part of an ounce, which at Paris is called the *semi-gros*. But the Spanish ounce is seven per cent. lighter than that of Paris. Stephens renders it in English by a *dram*.

ADATAIS, ADATS, or ADATYS, in commerce, a muslin or cotton-cloth, very fine and clear, of which the piece is ten French ells long, and three quarters broad. It comes from the East-Indies; and the finest is made at Bengal.

ADCRESCENTES, among the Romans, denoted a kind of soldiery, entered in the army, but not yet put on duty; from these the standing forces were recruited. See **ACCENSII**.

ADDA, in geography, a river of Switzerland and Italy, which rises in mount Braulio, in the country of the Grisons, and, passing through the Valatine, tra-

verses the lake Como and the Milanese, and falls into the Po, near Cremona.

ADDEPHAGIA, in medicine, a term used by some physicians, for gluttony, or a voracious appetite.

ADDER, in zoology, a vulgar name for the *Viper*; which see.

ADDESS-TONGUE. See **OPHIOGLOSSUM**; and **MATERIA MEDICA**, n° 504.

ADDER-WORM, or **SNAKEWEED.** See **BISTORTA**; and **MATERIA MEDICA**, n° 170.

ADDEXTRATOIRES, in the court of Rome, the pope's mitre-bearers, so called, according to Ducange, because they walk at the pope's right-hand when he rides to visit the churches.

ADDICE, or **ADZE**, a kind of crooked ax used by ship-wrights, carpenters, coopers, &c.

ADDICTI, in antiquity, a kind of slaves, among the Romans, adjudged to serve some creditor whom they could not otherwise satisfy, and whose slaves they became till they could pay or work out the debt.

ADDICTION, among the Romans, was the making over goods to another, either by sale, or by legal sentence; the goods so delivered were called *bona addicta*. Debtors were sometimes delivered over in the same manner; and thence called *servi addicti*.

ADDICTIO IN DIEM, among the Romans, the adjudging a thing to a person for a certain price, unless by such a day the owner, or some other, give more for it.

ADDISON (Lancelot), son of Lancelot Addison a clergyman, was born at Mouldiburne, in the parish of Crosby Ravenworth in Westmoreland, in the year 1632. He was educated at Queen's College, Oxford; and at the Restoration of king Charles II. accepted of the chaplainship of the garrison of Dunkirk; but that fortress being delivered up to the French in 1662, he returned to England, and was soon after made chaplain to the garrison of Tangier; where he continued seven years, and was greatly esteemed. In 1670, he returned to England, and was made chaplain in ordinary to the king; but his chaplainship of Tangier being taken from him on account of his absence, he found himself straitened in his circumstances, when he seasonably obtained the rectory of Milston, in Wiltshire, worth about 120 l. per annum. He afterwards became a prebendary of Sarum; took his degree of doctor of divinity at Oxford; and in 1683 was made dean of Litchfield, and the next year archdeacon of Coventry. His life was exemplary; his conversation pleasing, and greatly instructive; and his behaviour as a gentleman, a clergyman, and a neighbour, did honour to the place of his residence. He wrote, 1. *A Short Narrative of the Revolutions of the Kingdoms of Fez and Morocco*. 2. *The present History of the Jews*. 3. *A Discourse on Catechising*. 4. *A Modest Plea for the Clergy*. 5. *An Introduction to the Sacrament*. 6. *The first State of Mahometism*; and several other pieces. This worthy divine died on the 20th of April 1703 and left three sons: Joseph, the subject of the next article; Gullston, who died while governor of Fort St George; Lancelot, master of arts, and fellow of Magdalen College in Oxford; and one daughter, first married to Dr Sartre prebendary of Westminster, and afterwards to Daniel Combes, Esq.

ADDISON (Joseph), one of the brightest geniuses that this or any other country has produced, was the son.

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fon of dean Addison, the subject of the last article. He was born at Milfont, near Ambresbury, in Wiltshire, on the 11th of May 1672; and not being thought likely to live, was baptized the same day. He received the first rudiments of his education at the place of his nativity, under the reverend Mr Naith; but was soon removed to Salisbury, under the care of Mr Taylor; and from thence to the charter-house, where he commenced his acquaintance with Sir Richard Steele. About fifteen, he was entered at Queen's College, Oxford, where he applied very closely to the study of classical learning, in which he made a surprising proficiency. In the year 1687, Dr Lancaster, dean of Magdalen College, having, by chance, seen a Latin poem of Mr Addison's, was so pleased with it, that he immediately got him elected into that house, where he took up his degrees of bachelor and master of arts. His Latin pieces, in the course of a few years, were exceedingly admired in both universities; nor were they less esteemed abroad, particularly by the celebrated Boileau, who is reported to have said, that he would not have written against Perrault, had he before seen such excellent pieces by a modern hand. He published nothing in English before the twenty-second year of his age; when there appeared a short copy of verses written by him, and addressed to Mr Dryden, which procured him great reputation from the best judges. This was soon followed by a translation of the Fourth Georgic of Virgil, (omitting the story of Ariæus), much commended by Mr Dryden. He wrote also the Essay on the Georgics, prefixed to Mr Dryden's translation. There are several other pieces written by him about this time; amongst the rest, one dated the 3^d of April 1694, addressed to H. S. that is, Dr Sacheverel, who became afterwards so famous, and with whom Mr Addison lived once in the greatest friendship; but their intimacy was some time after broken off by their disagreement in political principles. In the year 1695, he wrote a poem to king William on one of his campaigns, addressed to Sir John Somers, lord keeper of the great seal. This gentleman received it with great pleasure, took the author into the number of his friends, and bestowed on him many marks of his favour. Mr Addison had been closely pressed, while at the university, to enter into holy orders; and had once resolved upon it: but his great modesty, his natural diffidence, and an uncommonly delicate sense of the importance of the sacred function, made him afterwards alter his resolution; and having expressed an inclination to travel, he was encouraged thereto by his patron above-mentioned, who, by his interest, procured him from the crown a pension of £. 300 *per annum* to support him in his travels. He accordingly made a tour to Italy in the year 1699; and, in 1701, he wrote a poetical epistle from Italy to the earl of Halifax, which has been universally esteemed as a most excellent performance. It was translated into Italian verse by the abbot Antonio Maria Salvini, Greek professor at Florence. In the year 1705, he published an account of his travels, dedicated to lord Somers; which, though at first but indifferently received, yet in a little time met with its deserved applause. In the year 1702, he was about to return to England, when he received advice of his being appointed to attend prince Eugene, who then commanded for the emperor in Italy: but the

death of king William happening soon after, put an end to this affair as well as his pension; and he remained for a considerable time unemployed. But an unexpected incident at once raised him, and gave him an opportunity of exerting his fine talents to advantage: for in the year 1704, the lord-treasurer Godolphin happened to complain to lord Halifax, that the duke of Marlborough's victory at Blenheim had not been celebrated in verse in the manner it deserved; and intimated, that he would take it kindly, if his lordship, who was the known patron of the poets, would name a gentleman capable of doing justice to so elevated a subject. Lord Halifax replied, somewhat hastily, that he did know such a person, but would not mention him; adding, that long had he seen, with indignation, men of no merit maintained in luxury at the public expence, whilst those of real worth and modesty were suffered to languish in obscurity. The treasurer answered very coolly, that he was sorry there should be occasion for such an observation, but that he would do his endeavour to wipe off such reproaches for the future; and he engaged his honour, that whoever his lordship named, as a person capable of celebrating this victory, should meet with a suitable recompence. Lord Halifax thereupon named Mr Addison; insisting, however, that the treasurer himself should send to him; which he promised. Accordingly he prevailed on Mr Boyle (afterwards lord Carlton) then chancellor of the exchequer, to make the proposal to Mr Addison; which he did in so polite a manner, that our author readily undertook the task. The lord-treasurer had a fight of the piece, when it was carried no farther than the celebrated simile of the angel; and was so pleased with it, that he immediately appointed Mr Addison a commissioner of appeals, vacant by the promotion of Mr Locke, chosen one of the lords commissioners for trade. The Campaign is addressed to the duke of Marlborough; it gives a short view of the military transactions in 1704, and contains a noble description of the two great actions at Schelleberg and Blenheim. The poem will be admired as long as the victory is remembered. In 1705, he attended lord Halifax to Hanover; and the ensuing year was appointed under-secretary to Sir Charles Hedges secretary of state; in which office he acquitted himself so well, that the earl of Sunderland, who succeeded Sir Charles in December, continued Mr Addison in his employment. A taste for operas beginning at this time to prevail in England, and many persons having solicited Mr Addison to write one, he complied with their request, and composed his Rosamond. This however, whether from the defect of the music, for which our language is said by some to be very improper, or from the prejudices in favour of the Italian taste, did not succeed upon the stage; but the poetry of it has, and always will be, justly admired. About this time, Sir Richard Steele composed his comedy of the Tender Husband, to which Mr Addison wrote a prologue. Sir Richard surprised him with a dedication of this play, and acquainted the public, that he was indebted to him for some of the most excellent strokes in the performance. The marquess of Wharton, being appointed lord lieutenant of Ireland in 1709, took Mr Addison with him as his secretary. Her majesty also made him keeper of the records of Ireland, and, as a farther mark of

Addison.

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Addison. her favour, considerably augmented the salary annexed to that place. Whilst he was in this kingdom, the Tatler was first published; and he discovered his friend Sir Richard Steele to be the author, by an observation on Virgil, which he had communicated to him. He afterwards assisted considerably in carrying on this paper, which the author acknowledges. The Tatler being laid down, the Spectator was set on foot, and Mr Addison furnished great part of the most admired papers; those which he wrote are distinguished by one of the letters of the muse, C, L, I, O. The Spectator made its first appearance in March 1711, and was brought to a conclusion in September 1712. He had likewise a considerable share in the Guardian, another paper in the same taste, which entertained the town in 1713 and 1714. His celebrated Cato appeared in 1713. He formed the design of a tragedy upon this subject when he was very young, and wrote it when on his travels: he retouched it in England, without any intention of bringing it on the stage; but his friends being persuaded it would serve the cause of liberty, he was prevailed on by their solicitations, and it was accordingly exhibited on the theatre with a prologue by Mr Pope, and an epilogue by Dr Garth. It was received with the most uncommon applause, having run thirty-five nights without interruption; and all parties, however divided, agreed in giving this play the commendation it deserved. It was no less esteemed abroad, having been translated into French, Italian, and German; and it was acted at Leghorn, and several other places, with vast applause. The Jesuits at St Omers made a Latin version of it, and the students acted it with great magnificence. Her majesty queen Anne signified an inclination of having the play dedicated to her; but the author having proposed to dedicate it elsewhere, to avoid giving offence, published it without a dedication. He had formed a design of writing another tragedy upon the death of Socrates; but this he never carried into execution. He intended also to have composed an English dictionary upon the plan of the Italian (Della Crusca); but, upon the death of the queen, being appointed secretary to the lords justices, he had not leisure to carry on such a work. When the earl of Sunderland was appointed lord lieutenant of Ireland, Mr Addison was again made secretary for the affairs of that kingdom; and, upon the earl's being removed from the lieutenancy, he was chosen one of the lords of trade. In 1715, he began the Freeholder, a political paper, which was much admired, and proved of great use at that juncture. He published also, about this time, verses to Sir Godfrey Kneller upon the king's picture, and some to the princess of Wales with the tragedy of Cato. In April 1717, his majesty king George appointed our author one of his principal secretaries of state; but the fatigue of his employment having brought upon him an athmatic disorder, with which he had been before afflicted, he resigned his office, and retired from business. In his retirement, he applied himself to a religious work*, which he had begun long before; part of

* Evidences of the Christian religion, which, scarce finished, has been printed in his works.

He intended also to have given an English paraphrase of some of David's psalms; but a long and painful relapse cut short all his designs, and carried off this great man on the 17th of June 1719, in the 54th year of

his age. He died at Holland-house, near Kensington, leaving behind him one daughter by the countess of Warwick, to whom he was married in 1716. After his disease, Mr Tickle, by the author's instructions, published his works in four volumes in 4^{to}. In this edition, there are several pieces hitherto unmentioned, viz. The Dissertation on Medals; which, though not published till after his death, yet he had collected the materials, and began to put them in order, at Vienna, in 1702. A pamphlet, entitled, The present State of the War, and the Necessity of an Augmentation, considered. The late Trial and Conviction of Count Tariff. The Whig Examiner came out on the 14th of September 1716: there were five of these papers attributed to Mr Addison, and they are the severest pieces he ever wrote. The Drummer, or the Haunted Horse, a comedy not taken notice of in this edition, was published afterwards as Mr Addison's, by Sir Richard Steele. He is said also to have been the author of a performance entitled *Dissertatio de insignioribus Romanorum Poetis*, and of a Discourse on Ancient and Modern Learning.

ADDITAMENT, something added to another. Thus physicians call the ingredients added to a medicine already compounded, *additamenta*.

ADDITION, is the joining together or uniting two or more things, or augmenting a thing by the accession of others thereto.

ADDITION, in ARITHMETIC, ALGEBRA, &c. see these articles.

ADDITION, in music, a dot marked on the right side of a note, signifying, that it is to be sounded or lengthened half as much more as it would have been without such mark.

ADDITIONS, in heraldry, some things added to a coat of arms, as marks of honour; and therefore directly opposite to abatements. Among additions we reckon **BORDURE**, **QUARTER**, **CANTON**, **GYRON**, **PILE**, &c. See these articles.

ADDRESS, a term often used to express the skill and propriety with which an affair is conducted.

Games of ADDRESS. See **GAMES**.

An ADDRESS, in a particular acceptance, is a congratulation, petition, or remonstrance, presented to a superior, especially to the king.

ADDUCENT MUSCLES, or **ADDUCTORS**, in anatomy, those muscles which pull one part of the body towards another.

ADEL, a kingdom on the eastern coast of Africa, which reaches as far as the straits of Babelmandel, which unites the Red Sea to the sea of Arabia. This country produces corn, and feeds a great number of cattle. The inhabitants drive a trade in gold, silver, ivory, oil, frankincense, a sort of pepper, and other merchandizes of Arabia and the Indies. The king was formerly a vassal to the grand negus of Abyssinia: but being Mahometans, and the Abyssinians a sort of Christians, they could not agree; and in 1535 came to an open rupture, when the Adelines threw off the yoke, seeking protection from the Grand Signior. The principal places are, Adela, seated in the centre of the country, and is the town where the king resides; Zeila, near the Arabian Sea, is a rich town, and has a good trade; Barbora, near the sea-coast, is an ancient trading town. It rains very seldom in this country.

Adelia
||
Adequate.

Adequate
||
Adian-
thium.

ADELIA, a genus of the monadelphia order, belonging to the diœcia class of plants. Of this genus there are three species; the *bernardia*, the *ricinella*, and *acideton*, for which we have no proper names in English. They are natives of Jamaica, and are akin to the ricinus or croton, and may be propagated in hot-beds from seeds procured from Jamaica; but they have little beauty, and are therefore seldom cultivated.

ADELME, or **ALDHLM**, son to Kenred, nephew to Ina, king of the West-Saxons; after having been educated abroad, was abbot of Malmbsury 30 years. He was the first Englishman who wrote in Latin, the first who brought poetry into England, and the first bishop of Sherburn. He lived in great esteem till his death, which happened in 709. He was canonized, and many miracles were told of him. He is mentioned with great honour by Camden and Bayle, and his life was written by William of Malmbsury.

ADELPHIANI, in church-history, a sect of ancient heretics, who fasted always on Sundays.

ADEMPION, in the civil law, implies the revocation of a grant, donation, or the like.

ADEN, formerly a rich and considerable town of Arabia the Happy. It is seated by the sea-side, a little eastward of the straits of Babelmandel.

ADENANTHERA, BASTARD FLOWER-FENCE, a genus of the monogynia order, belonging to the decandria class of plants. Only one species of this plant is known in Britain: but there is a variety, with scarlet seeds; which, however, is rare, and grows very slowly. It is a native of India, and rises to a considerable height. It is as large as the tamarind tree; spreads its branches wide on every side, and makes a fine shade; for which reason, it is frequently planted by the inhabitants in their gardens or near their habitations. The leaves of this tree are doubly winged, the flowers of a yellow colour, and disposed in a long bunch. These are succeeded by long twisted membranaceous pods, inclosing several hard compressed seeds, of a beautiful scarlet, or shining black, colour. This plant must be raised in a hot-bed, and kept during winter in a stove.

ADENBURG, or **ALDENBURG**, a town of Westphalia, and in the duchy of Burg, subject to the Elector Palatine. It is 12 miles N. E. of Cologne, and 17 W. of Bonn; E. long. 7.25. lat. 51. 2.

ADENOGRAPHY, that part of anatomy which treats of the glandular parts *.

ADENOIDES, glandulous, or of a glandular form; an epithet applied to the prostate †.

ADENOLOGY, the same with Adenography.

ADENOS, a kind of cotton, otherwise called *marine cotton*. It comes from Aleppo by the way of Mar-seilles, where it pays 20 per cent. duty.

ADEONA, in mythology, the name of a goddess invoked by the Romans when they set out upon a journey.

ADEPHAGIA, in mythology, the goddess of glutony, to whom the Sicilians paid religious worship.

ADEPS, in anatomy, the fat found in the abdomen. It also signifies animal fat of any kind *.

ADEPTS, a term among alchemists for those who pretended to have found the panacea or philosophers' stone. See *CHEMISTRY*, n° 5, 6.

ADEQUATE, something equal to or exactly corresponding with another.

ADEQUATE Idea, signifies a distinct or perfect conception of all the equalities of any object.

ABERBIJAN, a province of Persia, bounded on the N. by Armenia Proper, on the S. by Irac-Agemi, on the E. by Ghilan, and on the W. by Curdistan. The principal town is Tauris; from 42. to 48. long. from 36. to 39. lat.

ADERNO, a small place in the Val di Demona in the kingdom of Sicily: E. long. 15. 25. lat. 28. 5. The ancient Adranum: See *ADRANUM*.

ADESSENARIANS, **ADESSENARI**, in church-history, a sect of Christians, who hold the real presence of Christ's body in the eucharist, though not by way of transubstantiation. They differ considerably as to this presence; some holding that the body of Christ is in the bread; others, that it is about the bread; and others that it is under the bread.

ADFILATION, a Gothic custom, whereby the children of a former marriage are put upon the same footing with those of the second. This is also called *unio prolium*, and still retained in some parts of Germany.

AD FINES, (Antonie), a town of Switzerland, supposed to be the modern *Pfin*, in the north of the district of Turgow, on the rivulet Thur, not far from the borders of Suabia, about half-way between Constance and Frauenfeld. So called, because when Cœcinnus, general of the emperor Vitellius, with the auxiliary Rhetians, defeated the Helvetii, the former extended their borders thus far, their territory ending here; and, in time of the Romans, it was the last town in this quarter, and of some repute.

ADHA, (*Arab.*) A festival, which the Mahometans celebrate on the tenth day of the month *Dhoulhégia*, which is the twelfth and last of their year. This month being particularly destined for the ceremonies which the Pilgrims observe at Mecca, it takes its name from thence, for the word signifies the month of *Pilgrimage*. On that day they sacrifice with great solemnity, at Mecca, and nowhere else, a sheep, which is called by the same name as the festival itself. The Turks commonly call this festival the *Great Beiram*, to distinguish it from the lesser, which ends their fast, and which the Christians of the Levant call the *Easter of the Turks*. The Mahometans celebrate this festival, out of the city of Mecca, in a neighbouring valley; and sometimes they sacrifice there a camel. See *BEIRAM*.

ADHATODA, in botany. See *JUSTICIA*.

ACTION of ADHERENCE, in Scotslaw; an action competent to a husband or wife, to compel either party to adhere, in case of desertion *.

ADHESION, in a general sense, implies the sticking or adhering of two bodies together.

ADHESION, in philosophy. See *ATTRACTION of Cohesion*.

ADHESION, in anatomy, a term for one part sticking to another, which in a natural state are separate. For the most part, if any of those parts in the thorax or belly lie in contact, and inflame, they grow together. The lungs very frequently adhere to the pleura.

ADJACENT, an appellation given to such things as are situated near, or adjoining to each other.

ADIANTHUM, MAIDEN-HAIR; a genus of the order of silices, belonging to the cryptogamia class of plants.

Species. Of this genus botanical writers enume-
rate

* See
Anatomy,
n° 391, &c.
† *Ibid.*
n° 371.

* *Id.* n° 82. men.

* See *Law*,
Part III.
N° clx. 24.

Adiapho-
rits
||
Adjunct.

rate fifteen species; the most remarkable are the following. 1. The capillus veneris, or true maiden-hair, is a native of the southern parts of France, from whence it is brought to Britain; though it is likewise said to grow plentifully in Cornwall, and the Trichomanes has been almost universally substituted for it. 2. The pedatum, or American maiden-hair, is a native of Canada; and grows in such quantities, that the French send it from thence in package for other goods, and the apothecaries at Paris use it for maiden-hair in the compositions wherein that is ordered. 3. The trapeziforme, or black American maiden-hair, is a native of Jamaica; and has shining black stalks, and leaves of an odd shape, which make an agreeable variety among other plants, so is sometimes cultivated in gardens.

Culture. The first species grows naturally out of the joints of walls, and fissures of rocks. It ought therefore to be planted in pots filled with gravel and lime-rubbish; where it will thrive much better than in good earth. It must also be sheltered under a frame during the winter.—The second is to be treated in the same manner; but the third will not thrive in Britain, unless kept in a stove during the winter.*

ADIAPHORISTS, in church-history, a name importing lukewarmness, given, in the 16th century, to the moderate Lutherans, who embraced the opinions of Melancthon, whose disposition was vastly more pacific than that of Luther.

ADJAZZO, ADRAZZO, or AJACCIO, in geography, a handsome town and castle of Corsica in the Mediterranean, with a bishop's see, and a good harbour. It is populous, and fertile in wine. It is 27 miles S. W. of Corte. E. long. 41. 54. lat. 38. 5.

ADJECTIVE. See GRAMMAR, n° 50, 51.

ADIGE, a river in Italy, which taking its rise south of the lake Glace among the Alps, runs south by Trent, then east by Verona in the territory of Venice, and falls into the gulph of Venice, north of the mouth of the Po.

ADJOURNMENT, the putting off a court, or other meeting, till another day. There is a difference between the adjournment and the prorogation of the parliament; the former not only being for a shorter time, but also done by the house itself; whereas the latter is an act of royal authority.

ADIPOSE, a term used by anatomists for any cell, membrane, &c. that is remarkable for its fatness.

ADIRBEITSAN, in geogr. a province of Persia, in Asia, and part of the ancient Media. It is bounded on the N. by the province of Shirvan, on the S. by Irac-Agemi and Curditan, on the E. by Gilan and the Caspian sea, and on the W. by Turcomania.

ADIT, the passage to, or entrance of, any thing; as the adit of a mine, &c.

ADJUDICATION, implies the act of adjudging, or determining, a cause in favour of some person.

ADJUDICATION, in Scots law, the name of that action by which a creditor attaches the heritable estate of his debtor, or his debtor's heir, in order to appropriate it to himself, either in payment or security of his debt; or, that action by which the holder of an heritable right, labouring under any defect in point of form, may supply that defect*.

ADJUNCT, among philosophers, signifies something added to another, without being any necessary part of

it. Thus water absorbed by cloth or a sponge, is an adjunct, but no necessary part of either of these substances.

ADJUNCT, in metaphysics, some quality belonging to either the body or mind, whether natural or acquired. Thus thinking is an adjunct of the mind, and growth an adjunct of the body.

ADJUNCT, in music; a word which is employed to denominate the connection or relation between the principal mode and the modes of its two-fifths, which, from the intervals that constitute the relation between them and it, are called its *adjuncts*.

ADJUNCT is also used to signify a colleague, or some person associated with another as an assistant.

ADJUNCT Gods, or ADJUNCTS of the Gods, among the Romans, were a kind of inferior deities, added as assistants to the principal ones, to ease them in their functions. Thus, to Mars was adjoined Bellona and Nemesis; to Neptune, Salacia; to Vulcan, the Cabiri; to the Good Genius, the Lares; to the Evil, the Lemures, &c.

ADJUNCTS, in rhetoric and grammar, signify certain words or things added to others, to amplify or augment the force of the discourse.

ADJUNCTS, or ADJOINTS, in the royal academy of sciences at Paris, denote a class of members, attached to the pursuit of particular sciences. The class of *Adjuncts* was created in 1716, in lieu of the *Elèves*; they are twelve in number; two for geometry, two for mechanics, two for astronomy, two for anatomy, two for chemistry, and two for botany. The *Elèves* not taken into this establishment were admitted on the foot of *supernumery Adjuncts**.

ADJUTANT, in the military art, is an officer whose business it is to assist the major. Each battalion of foot and regiment of horse has an adjutant, who receives the orders every night from the brigade-major; which, after carrying them to the colonel, he delivers out to the sergeants. When detachments are to be made, he gives the number to be furnished by each company or troop, and assigns the hour and place of rendezvous. He also places the guards; receives, and distributes the ammunition to the companies, &c.; and, by the major's orders, regulates the prices of bread, beer, and other provisions. The word is sometimes used by the French for an *aid-du-camp*.

ADJUTANTS-general, among the Jesuits, a select number of fathers, residing with the general of the order, each of whom has a province or country assigned him, as England, Holland, &c. and their business is to inform the father-general of state-occurrences in such countries. To this end they have their correspondents delegated, emissaries, visitors, regents, provincials, &c.

ADJUTORIUM, a term used by physicians for any medicine in a prescription but the capital one.

ADLE-EGGS, such as have not received an impregnation from the semen of the cock.

ADLOCUTION, ADLOCUTIO, in antiquity, is chiefly understood of speeches made by Roman generals to their armies, to encourage them before a battle. We frequently find these adlocutions expressed on medals by the abbreviation ADLOCUT. COH.—The general is sometimes represented as seated on a tribunal, often on a bank or mount of turf, with the cohorts

Adjunct
||
Adlocution

* See
also *Mathe-
ria Medica*,
n° 73.

* See
Academy,
N° v. par. 8
et seq.

* See *Laws*,
Part III,
n° cxxxii. 6,
&c.

Admiral
||
Admiral.

ranged orderly round him, in *manipuli* and *turme*. The usual formula in adlocutions was, *Fortis efficitur ad fidem*.

ADMIRAL, a term used, chiefly in old law-books, to imply an aid, help, assistance, or support. The word is Latin, *admiraculum*; and derived from *admiraculo*, to prop, or support.

ADMIRAL, in Scots law, signifies any writing or deed referred to by a party, in an action of law, for proving his allegations.

ADMIRAL, an ancient officer of the church, whose business it was to attend to and defend the cause of the widows, orphans, and others destitute of help.

ADMINISTRATION, in general, the government, direction, or management of affairs, and particularly the exercise of distributive justice; among ecclesiastics, it is often used to express the giving or dispensing the sacraments, &c.

ADMINISTRATION, is also the name given by the Spaniards in Peru to the staple magazine, or warehouse, established at Callao, a small town on the S. Sea, which is the port of Lima, the capital of that part of South America, and particularly of Peru. The foreign ships, which have leave to trade along that coast, are obliged to unload here, paying 13 per cent. of the price they sell for, if the cargo be entire, and even 16 per cent. if otherwise; besides which, they pay 3 per 1000, duty, for consularship and some other small royal rights and claims.

ADMINISTRATOR, in law. See there, N° xiv. 3, 7, 8. and clxi. 6.

ADMINISTRATOR, is sometimes used for the president of a province; for a person appointed to receive, manage, and distribute, the revenues of an hospital or religious house; for a prince who enjoys the revenues of a secularized bishopric; and for the regent of a kingdom, during a minority of the prince, or a vacancy of the throne.

ADMIRABILIS SAL, the same with Glauber's salt. See **CHEMISTRY**, N° 124.

ADMIRAL, a great officer, or magistrate, who has the government of a navy, and the hearing of all maritime causes.

Authors are divided with regard to the origin and denomination of this important officer, whom we find established in most kingdoms that border on the sea. But the most probable opinion is that of Sir Henry Spelman, who thinks, that both the name and dignity were derived from the Saracens, and, by reason of the holy wars, brought amongst us; for *admiral*, in the Arabian language, signifies a prince, or chief ruler, and was the ordinary title of the governors of cities, provinces, &c. and therefore they called the commander of the navy by that name, as a name of dignity and honour. And indeed there are no instances of admirals in this part of Europe before the year 1284, when Philip of France, who had attended St Lewis in the wars against the Saracens, created an admiral. Du Cange assures us, that the Sicilians were the first, and the Genoese the next, who gave the denomination of Admiral to the commanders of their naval armaments; and that they took it from the Saracens or Arabic *E-mir*, a general name for every commanding officer. As for the exact time when the word was introduced among us, it is uncertain; some think it was in the reign of

Admiral.

Edward I. Sir Henry Spelman is of opinion that it was first used in the reign of Henry III. because neither the laws of Oleron made in 1266, nor Bracton, who wrote about that time, make any mention of it; and that the term *admiral* was not used in a charter in the eighth of Henry III. wherein he granted this office to Richard de Lacey, by these words *Maritimum Anglie*; but in the 56th year of the same reign, not only the historians, but the charters themselves, very frequently use the word *admiral*.

Anciently there were generally three or four admirals appointed in the English seas, all of them holding the office *durante bene placito*; and each of them having particular limits under their charge and government; as admirals of the fleet of ships, from the mouth of the Thames northward, southward, or westward. Besides these, there were admirals of the Cinque Ports, as in the reign of Edward III. when one William Latimer was styled *admiralis quinque portuum*; and we sometimes find that one person has been admiral of the fleets to the southward, northward, and westward: but the title of *admiralis Anglie* was not frequent till the reign of Henry IV. when the king's brother had that title given him, which in all commissions afterwards was granted to the succeeding admirals. It may be observed, that there was a title above that of admiral of England, which was, *locum-tenens regis super mare*, the king's lieutenant-general of the sea; this title we find mentioned in the reign of Richard II.—Before the use of the word *admiral* was known, the title of *custos maris* was made use of.

Lord High Admiral of England, in some ancient records called *capitaneus maritimarum*, an officer of great antiquity and trust, as appears by the laws of Oleron, so denominated from the place they were made at by Richard I. The first title of Admiral of England, expressly conferred upon a subject, was given by patent of Richard II. to Richard Fitz-Allen, jun^r, earl of Arundel and Surrey; for those who before enjoyed this office were simply termed admirals, though their jurisdiction seems as large, especially in the reign of Edward III. when the court of admiralty was first erected.

This great officer has the management of all maritime affairs, and the government of the royal navy, with power of decision in all maritime cases, both civil and criminal: he judges of all things done upon or beyond the sea, in any part of the world: upon the sea-coasts, in all ports and havens, and upon all rivers below the first bridge from the sea. By him, vice-admirals, rear-admirals, and all sea-captains, are commissioned; all deputies for particular coasts, and coroners to view dead bodies found on the sea-coasts, or at sea: he also appoints the judges for his court of admiralty, and may imprison, release, &c. All ports and havens are *infra corpus comitatus*, and the admiral hath no jurisdiction of any thing done in them. Between high and low water-mark, the common-law and the high-admiral have jurisdiction by turns, one upon the water, and the other upon the land.

The lord-admiral has power, not only over the seamen serving in his ships of war, but over all other seamen, to arrest them for the service of the state; and, if any of them run away, without leave of the admiral, he hath power to make a record thereof, and certify the same to the sheriffs, mayors, bailiffs, &c. who shall

Admiral
Admiralty.

shall cause them to be apprehended and imprisoned.

To the lord high-admiral belong all penalties and amercements of all transgressions at sea, on the sea-shore, in ports and havens, and all rivers below the first bridge from the sea; the goods of pirates and felons condemned or enslaved, sea-wrecks, goods floating on the sea, or cast on the shore (not granted to lords of manors adjoining to the sea), and a share of lawful prizes; also all great fishes, commonly called royal fishes, except whales and sturgeons: to which add, a salary of 7000*l.* a-year.

In short, this is so great an office, in point of trust, honour, and profit, that it has been usually given to princes of the blood, or the most eminent persons among the nobility. We have had no high admiral for some years; the office being put in commission, or under the administration of the lords commissioners of the admiralty, who by statute have the same power and authority as the lord high admiral.

High Admiral in Scotland, a judge invested with supreme jurisdiction in all maritime cases within that part of Britain.

ADMIRAL, also implies the commander in chief of any single fleet or squadron; or, in general, any flag-officer whatever. The commander of a fleet carries his flag at the main-top-mast head.

Vice ADMIRAL, is the commander of the second squadron, and carries his flag at the fore-top-mast head.

Rear ADMIRAL, is the commander of the third squadron, and carries his flag at the mizzen-top-mast head.

Vice ADMIRAL, is also an officer appointed by the lords commissioners of the admiralty. There are several of these officers established in different parts of Great Britain, with judges and marshals under them, for executing jurisdiction within their respective limits. Their decrees, however, are not final, an appeal lying to the court of admiralty in London.

ADMIRAL is also an appellation given to the most considerable ship of a fleet of merchant-men, or of the vessels employed in the cod-fishery of Newfoundland. This last has the privilege of choosing what place he pleases on the shore to dry his fish; gives proper orders, and appoints the fishing-places to those who come after him; and as long as the fishing-season continues, he carries a flag on his main-mast.

ADMIRAL, in zoology, the English name of a species of the voluta, a shell-fish belonging to the order of vermes testacea. See *VOLUTA*.

ADMIRALTY properly signifies the office of lord high-admiral, whether discharged by one single person, or by joint commissioners called lords of the admiralty.

Court of ADMIRALTY, is a sovereign court, held by the lord high-admiral, or lords of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal.—All crimes committed on the high-seas, or on great rivers below the first bridge next the sea, are cognizable in this court only, and before which they must be tried by judge and jury. But in civil cases the mode is different, the decisions being all made according to the civil law. From the sentences of the admiralty-judge an appeal always lay, in ordinary course, to the king in chancery, as may be collected from statute 25 Hen. VIII. c. 19. which directs the appeal from the archbishop's courts to be determined by persons named in the king's commission, "like as in

"case of appeal from the admiral-court." But this is also expressly declared by statute 8 Eliz. c. 5. which enacts, that upon an appeal made to the chancery, the sentence definitive of the delegates appointed by commission shall be final.

Appeals from the vice-admiralty courts in America, and our other plantations and settlements, may be brought before the courts of admiralty in England, as being a branch of the admiral's jurisdiction, tho' they may also be brought before the king in council. But in case of prize-vessels, taken in time of war, in any part of the world, and condemned in any courts of admiralty or vice-admiralty as lawful prize, the appeal lies to certain *commissioners of appeals* consisting chiefly of the privy council, and not to judges delegates. And this by virtue of divers treaties with foreign nations, by which particular courts are established in all the maritime countries of Europe for the decision of this question, Whether lawful prize or not: for this being a question between subjects of different states, it belongs entirely to the law of nations, and not to the municipal laws of either country, to determine it.

Court of ADMIRALTY in Scotland. See *LAW*, Part III. N^o clvii. 15.

ADMIRATION, in general, denotes surprize, wonder, or astonishment, at any extraordinary event. Sometimes also it signifies the expression of wonder. The point of admiration, in grammar, is marked thus [!].

ADMONITION, in ecclesiastical affairs, a part of discipline much used in the ancient church. It was the first act, or step, towards the punishment or expulsion of delinquents. In case of private offences, it was performed according to the evangelical rule, privately: in case of public offence, openly, before the church. If either of those sufficed for the recovery of the fallen person, all further proceedings in the way of censure ceased: if they did not, recourse was had to excommunication.

ADMONITIO Fustium, among the Romans, a military punishment, not unlike our whipping, only it was performed with vine-branches.

ADMORTIZATION, in the feudal customs, the reduction of the property of lands or tenements to mortmain. See *MORTMAIN*.

ADNATA, in anatomy, one of the coats of the eye, which is also called *conjunctiva* and *albuginea* *.

ADNATA, is also used for any hair, wool, or the like, which grows upon animals or vegetables.

ADNOUN, is used by some grammarians to express what we more usually call an Adjective. The word is formed by way of analogy, to adverb; in regard adjectives have much the same office and relation to nouns, that adverbs have to verbs. Bishop Wilkins uses the word *adname* in another sense, *viz.* for what we otherwise call a preposition.

ADOLESCENCE, the state of growing youth; or that period of a person's age commencing from his infancy, and terminating at his full stature or manhood. The word is formed of the Latin *adolescere*, to grow.—The state of adolescence lasts so long as the fibres continue to grow, either in magnitude or firmness. The fibres being arrived at the degree of firmness and tension sufficient to sustain the parts, no longer yield and give way to the efforts of the nutritious matter to extend them; so that their farther accretion

Admiralty
Adollam.* See
Anatomy,
n^o 406. b, i.

Adon
Adonis.

cretion is stopped, from the very law of their nutrition. ADOLLAM, or ODOLLAM, (anc. geogr.) a town in the tribe of Judah, to the east of Eleutheropolis. David is said to have hid himself in a cave near this town, (Bible.)

ADON, a populous village in the province of Stuhl-Weissenberg, belonging to Hungary. It lies in a fruitful country, towards the river Danube. Long. 19. 20. Lat. 47. 30.

ADONAI, one of the names of the Supreme Being in the scriptures. The proper meaning of the word is *my lord*, in the plural number; as *Adoni* is *my lord*, in the singular.

ADONIA, in antiquity, solemn feasts in honour of Venus, and in memory of her beloved Adonis. The Adonia were observed with great solemnity by most nations; Greeks, Phœnicians, Lycians, Syrians, Egyptians, &c. From Syria, they are supposed to have passed into India. The prophet Ezekiel* is understood to speak of them. They were still observed at Alexandria, in the time of St Cyril; and at Antioch in that of Julian the apostate, who happened to enter that city during the solemnity, which was taken for an ill omen. The Adonia lasted two days: on the first of which certain images of Venus and Adonis were carried, with all the pomp and ceremonies practised at funerals; the women wept, tore their hair, beat their breasts, &c. imitating the cries and lamentations of Venus for the death of her paramour. This lamentation they called *Adoniai pos*. The Syrians were not contented with weeping, but gave themselves discipline, shaved their heads, &c. Among the Egyptians, the queen herself used to carry the image of Adonis in procession. St Cyril mentions an extraordinary ceremony practised by the Alexandrians: A letter was written to the women of Byblus, to inform them that Adonis was found again: this letter was thrown into the sea, which (it was pretended) did not fail punctually to convey it to Byblus in seven days; upon the receipt of which, the Byblian women ceased their mourning, sung his praises, and made rejoicings as if he were raised to life again: Or rather, according to Meursius, the two offices of mourning and rejoicing made two distinct feasts, which were held at different times of the year, the one six months after the other; Adonis being supposed to pass half the year with Proserpine, and half with Venus.—The Egyptian Adonia are said to have been held in memory of the death of Osiris; by others, of his sickness and recovery. Bishop Patrick dates their origin from the slaughter of the first-born under Moses.

ADONIDES, in botany, a name given to botanists who described or made catalogues of plants cultivated in any particular place.

ADONIS, son to Cinyras king of Cyprus, the darling of the goddess Venus: being killed by a wild boar in the Italian woods, he was turned into a flower of a blood-colour, supposed to be the Anemone. Venus was inconsolable; and no grief was ever more celebrated than this, most nations having perpetuated the memory of it by a train of anniversary ceremonies*. Among Shakspeare's poems, is a long one on the subject of Venus's affection for Adonis. See MYRRHA.

ADONIS, in zoology. See EXOCOETUS.

ADONIS, or BIRD'S-EYE, or PHEASANTS-EYE; a genus of the polyandria order, belonging to the polygynia class of plants.

Adonis
Adoption

Species. Of this genus there are four different species enumerated; the most remarkable are the following. 1. The annual, or common adonis, is a native of Kent, where it is found in great plenty in the fields sown with wheat. Its flowers are of a beautiful scarlet colour, and appear in the beginning of June; the seeds ripening in August and September. Great quantities of these flowers are sold in London, under the name of Red Morocco. 2. The æstivalis, or annual adonis, with yellow flowers, grows much taller than the first, has its leaves thinner set, and of a lighter colour. 3. The vernalis, or perennial adonis, grows naturally on the mountains of Bohemia, Prussia, and other parts of Germany. It flowers the latter end of March, or beginning of April; the stalks rise about a foot and a half high; and when the roots are large, and have stood unremoved for some years, they will put out a great number of stalks from each root; on the top of each of these grows one large yellow flower. 4. The apennina, represented on Plate III. fig. 1. is a native of Siberia and the Apennines.

Culture. The first two species, being annual, must be propagated from seeds, which ought to be sown in autumn, soon after they are ripe, or they will be in danger of not growing up that year. They thrive best in a light soil. The third and fourth species are likewise to be propagated from seeds, which must be sown in autumn, or they seldom succeed. When the plants come up, they must be carefully kept clear from weeds; and in very dry weather their growth will be promoted by being now and then watered. They should remain in the place where they are sown till the second year; and be transplanted thence in autumn, to the place where they are to remain.

ADOPTIANI, in church-history, a sect of ancient heretics, followers of Felix of Urgel, and Elipand of Toledo, who, towards the end of the eighth century, advanced the notion, that Jesus Christ, in his human nature, is the son of God, not by nature, but by adoption.

ADOPTION, an act by which any one takes another into his family, owns him for his son, and appoints him for his heir.—The custom of adoption was very common among the ancient Romans; yet it was not practised, but for certain causes expressed in the laws, and with certain formalities usual in such cases: they first learnt it from the Greeks, among whom it was called *τὸ ὑιοθεῖν*. This adoption was a sort of imitation of nature, intended for the comfort of those who had no children: wherefore he that was to adopt was to have no children of his own, and to be past the age of getting any; nor were eunuchs allowed to adopt, as being under an actual impotency of begetting children; neither was it lawful for a young man to adopt an elder, because that would have been contrary to the order of nature; nay, it was even required that the person who adopted should be eighteen years older than his adopted son, that there might at least appear a probability of his being the natural father.—Among the Turks, the ceremony of adoption is performed by obliging the person adopted to pass thro' the throat of the adopter. Hence, among that people, to adopt, is expressed by the phrase, *to draw another through my throat*. It is said, that something like this has also been observed among the Hebrews; where the prophet Elijah adopted Eliha for his son and successor, and communicated

*Ch.viii.14.

See Adonia. of it by a train of anniversary ceremonies.

cated to him the gift of prophecy, by letting fall his cloak or mantle on him. But *adoption*, properly so called, does not appear to have been practised among the ancient Jews: Moses says nothing of it in his laws; and Jacob's adoption of his two grandsons, Ephraim and Manasseh, is not so properly an adoption, as a kind of substitution, whereby those two sons of Joseph were allotted an equal portion in Israel with his own sons.

ADOPTION is also used, in theology, for a federal act of God's free grace; whereby those who are regenerated by faith, are admitted into his household, and entitled to a share in the inheritance of the kingdom of heaven.

ADORATION, the act of rendering divine honours; or of addressing a being, as supposing it a god. The word is compounded of *ad*, to; and *as*, *oris*, mouth; and literally signifies, to apply the hand to the mouth; *Manum ad os admoveo*, *q. d.* to kiss the hand; this being, in the eastern countries, one of the great marks of respect and submission.—The Romans practised adoration at sacrifices, and other solemnities; in passing by temples, altars, groves, &c.; at the sight of statues, images, or the like, whether of stone or wood, wherein any thing of divinity was supposed to reside. Usually there were images of the gods placed at the gates of cities, for those who went in or out, to pay their respects to.—The ceremony of adoration among the ancient Romans was thus: The devotee having his head covered, applied his right hand to his lips, the fore-finger resting on his thumb, which was erect, and thus bowing his head, turned himself round from left to right. The kiss thus given was called *osculum labratum*; for ordinarily they were afraid to touch the images of their gods themselves with their profane lips. Sometimes, however, they would kiss their feet, or even knees, it being held an incivility to touch their mouths; so that the affair passed at some distance. Saturn, however, and Hercules, were adored with the head bare; whence the worship of the last was called *institutum peregrinum*, and *ritus Græcivicius*, as departing from the customary Roman method, which was to sacrifice and adore with the face veiled, and the cloths drawn up to the ears, to prevent any interruption in the ceremony by the sight of unlucky objects.—The Jewish manner of adoration was by prostration, bowing, and kneeling.—The Christians adopted the Grecian rather than the Roman method, and adored always uncovered. The ordinary posture of the ancient Christians was kneeling, but on Sundays standing; and they had a peculiar regard to the East, to which point they ordinarily directed their prayers.

ADORATION is more particularly used for the act of praying, or preferring our requests or thanksgivings to Almighty God.

ADORATION is also used for certain extraordinary civil honours or respects which resemble those paid to the Deity, yet are given to men.

The Persian manner of *Adoration*, introduced by Cyrus, was by bending the knee, and falling on the face at the prince's feet, striking the earth with the forehead, and kissing the ground. This ceremony, which the Greeks called *προσκύνησις*, Conon refused to perform to Artaxerxes, and Calisthenes to Alexander the Great, as repugnant to impiety and unlawful.

The *Adoration* performed to the Roman and Grecian

emperors consisted in bowing or kneeling at the prince's feet, laying hold of his purple robe, and presently withdrawing the hand and clapping it to the lips. Some attribute the origin of this practice to Constantine. It was only persons of some rank or dignity that were entitled to the honour. Bare kneeling before the emperor to deliver a petition, was also called *adoration*.

The practice of *adoration* may be said to be still subsisting in England, in the ceremony of kissing the king's or queen's hand, and in serving them at table, both being performed kneeling.

ADORATION is more particularly used for kissing one's hand in presence of another, as a token of reverence.—The Jews adored by kissing their hands and bowing down their heads; whence, in their language, *kissing* is properly used for *adoration*.

ADORATION is also used among Roman writers for a high species of applause given to persons, who had spoken or performed well in public*. We meet with adoration paid to orators, actors, musicians, &c. The method of expressing it was, by rising, putting both hands to their mouth, and then returning them towards the person intended to be honoured.

ADORATION is also used, in the court of Rome, for the ceremony of kissing the pope's feet.—The introduction of adoration among the Romans is ascribed to the low flattery of Vitellius, who, upon the return of C. Cæsar from Syria, would not approach him otherwise than with his head covered, turning himself round, and then falling on his face. Heliogabalus restored the practice, and Alexander Severus again prohibited it. Dioclesian redemanded it; and it was, in some measure, continued under the succeeding princes, even after the establishment of Christianity, as Constantine, Constantine, &c. It is particularly said of Dioclesian, that he had gems fastened to his shoes, that divine honours might be more willingly paid him, by kissing his feet. The like usage was afterwards adopted by the popes, and is observed to this day. These prelates finding a vehement disposition in the people to fall down before them and kiss their feet, procured crucifixes to be fastened on their slippers; by which stratagem, the adoration intended for the pope's person is supposed to be transferred to Christ. Divers acts of this adoration we find offered even by princes to the pope.

ADORATION is also used for a method of electing a pope. The election of popes is performed two ways; by *adoration*, and by *scrutiny*. In election by adoration, the cardinals rush hastily, as if agitated by some spirit, to the adoration of some one among them, to proclaim him pope. When the election is carried by scrutiny, they do not adore the new pope till he is placed on the altar.

Barbarous ADORATION is a term used, in the laws of king Canute, for that performed after the manner of the heathens who adored idols. The Romish church is charged with the adoration of saints, martyrs, images, crucifixes, relics, the virgin, and the host; all which by Protestants are generally aggravated into idolatry, on a supposition, that the honour thus paid to them is absolute and supreme, called by way of distinction *Latria*, which is due only to God. Roman-catholics, on the contrary, explain them, as only a relative or subordinate worship, called *Dulia* and *Hyperdulia*, which terminates ultimately in God alone. But may not the same

* See
Acclamations

Adescu-
lation
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Adranum.

same be said of the idol-worship of the heathens? The Phœnicians adored the winds, on account of the terrible effects produced by them; the same was adopted by most of the other nations, Persians, Greeks, Romans, &c. The Persians chiefly paid their adorations to the sun and fire; some say also to rivers, the wind, &c. The motive of adoring the sun was the benefits they received from that glorious luminary, which of all creatures has doubtless the best pretensions to such homage.

ADOSCULATION, a term used by Dr Grew, to imply a kind of impregnation, without intromission; and in this manner he supposes the impregnation of plants is effected by the falling of the farina fecundans on the pistil.

ADOSEE, in heraldry, signifies two figures or bearings being placed back to back.

ADOUR, the name of a river of France, which rises in the mountains of Bigorre, and running N. by Tarbes through Gascony, afterwards turns E. and, passing by Dax, falls into the bay of Biscay, below Bayonne.

ADOKA, TUBEROUS MOSCHATEL, or HOLLOW-ROOT; a genus of the tetragynia order, belonging to the octandria class of plants. This is a native of the woods in Britain, and several parts of Europe: it is a very low plant, seldom rising more than four or five inches high; the leaves resemble those of bulbous fumitory; the flower-stalk arises immediately from the root, on the top of which grow four or five small flowers of an herbaceous white colour, which appear in the beginning of April, and the berries ripen in May; soon after which, the leaves decay. The herb may be procured by transplanting the roots any time after the leaves decay, till winter. They must be planted in the shade, under shrubs; for they will not thrive if exposed to the sun. The leaves and flowers smell like musk, from whence it has by some been called *musk-crowfoot*.

AD *Pondus Omnium*, among physicians, an abbreviation in their prescriptions, signifying that the last mentioned ingredient is to weigh as much as all the rest together.

AD *Quod Damnum*, in the English law, a writ directed to the sheriff, commanding him to inquire into the damage which may befall from granting certain privileges to a place, as a fair, market, or the like.

ADRAMMELECH, one of the gods of the inhabitants of Sepharvaim, who were settled in the country of Samaria, in the room of those Israelites who were carried beyond the Euphrates. The Sepharvaimes made their children pass through the fire, in honour of this idol and another called Anamelech. It is supposed, that Adramelech meant the sun, and Anamelech the moon: the first signifies the *magnificent king*; the second the *gentle king*. See ANAMELECH.

ADRAMYTITUM, (anc. geogr.) now *Andramiti*; a town of Myfia Major, at the foot of mount Ida, an Athenian colony, with a harbour and dock near the Caiicus. *Adramyttenus* the epithet; as, *Adramyttenus Sinus*, a part of the Egean Sea, on the coast of Myfia; *Adramyttenus Conventus*, sessions or assizes. The eighth in order of the nine *Conventus Juridici* of the province of Aſia.

ADRANUM, or HADRANUM, (anc. geogr.) now *Aderno*, a town of Sicily, built by the elder Dionysius, at the foot of mount Ætna, (Diodorus Siculus), four

hundred years before Christ. So called from the temple of Adranus, or Hadranus, a god much worshipped by the Sicilians; with a river of the same name, (Stephanus,) now *Fiume d' Aderno*. The inhabitants, *Hadrantiani*, and *Adranitæ*.

ADRASTIA, in antiquity, an epithet given to the goddess Nemesis, or Revenge. It was taken from king Adrastus, who first erected a temple to that deity.

ADRASTIA *Certamina*, in antiquity, a kind of Pythian games, instituted by Adrastus king of Argos, in the year of the world 2700, in honour of Apollo, at Sicyon. These are to be distinguished from the Pythian games celebrated at Delphi.

ADRASTUS, king of Argos, son of Talauus and Lyfianiffa, daughter of Polybius king of Sicyon, acquired great honour in the famous war of Thebes, in support of Polyneices his son-in-law, who had been excluded the sovereignty of Thebes by Eteocles his brother, notwithstanding their reciprocal agreement. Adrastus, followed by Polyneices and Tydeus his other son-in-law, by Capaneus and Hippomedon his sister's sons, by Amphiarauus his brother-in-law, and by Parthenopeus, marched against the city of Thebes; and this is the expedition of the Seven Worthies, which the poets have so often sung. They all lost their lives in this war, except Adrastus, who was saved by his horse called Arion. This war was revived ten years after by the sons of those deceased warriors, which was called the war of the Epigones, and ended with the taking of Thebes. None of them lost their lives, except Ægialeus son of Adrastus; which afflicted him so much, that he died of grief in Megara, as he was leading back his victorious army.

ADRAZZO, or AJACCIO. The same with ADJAZZO.

ADRIA, or HADRIA, (anc. geogr.) the name of two towns in Italy. One in the country of the Veneti, on the river Tartarus, between the Padus and the Athetis, called *Atria* by Pliny and Ptolemy, but *Adria* by Strabo. Another on the river Vomanus, in the territory of the Piceni, (to which Antonine's Itinerary from Rome is directed,) the country of the ancestors of the emperor Adrian. From which of these the Adriatic sea is denominated, is matter of doubt. A third opinion is, that it is so called from Hadria the son of Joan, of Italian origin; (Eustathius in Dionysium.)

ADRIANUM (or ADRIATICUM) MARE, (anc. geogr.) now the Gulf of Venice, a large bay in the Mediterranean, between Dalmatia, Slavonia, Greece, and Italy. It is called by the Greeks, *Ἀδριατικὸν Πέλαγος*; and *Adria* by the Romans, as *Arbiter Adria Notus*, Hor. Cicero calls it *Hadrianum Mare*; Virgil has *Hadriaticæ Undæ*. It is commonly called *Mare Adriaticum*, without an aspiration; but whether it ought to have one, is a dispute: if the appellation is from *Hadria*, the town of the Piceni, it must be written *Hadriaticum*, because the emperor's name, who thence derives his origin, is on coins and stones *Hadrianus*; but if from the town in the territory of Venice, as the more ancient, and of which that of the Piceni is a colony, this will justify the common appellation *Adriaticum*.

ADRIAN, or HADRIAN, (Publius Ælius), the Roman emperor. He was born at Rome the 24th of January, in the 76th year of Christ. His father left him

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Adrian

Adrian.

an orphan, at ten years of age, under the guardianship of Trajan, and Cælius Tatianus a Roman knight. He began to serve very early in the armies, having been tribune of a legion before the death of Domitian. He was the person chosen by the army of Lower Mæsia, to carry the news of Nerva's death to Trajan, successor to the empire. He accompanied Trajan in most of his expeditions, and particularly distinguished himself in the second war against the Daci; and having before been quæstor, as well as tribune of the people, he was now successively prætor, governor of Pannonia, and consul. After the siege of Atræ in Arabia was raised, Trajan, who had already given him the government of Syria, left him the command of the army: and at length, when he found death approaching, it is said he adopted him. Adrian, who was then in Antiochia, as soon as he received the news thereof, and of Trajan's death, declared himself emperor, on the 11th of August, 117. No sooner had he arrived at the imperial dignity, than he made peace with the Persians, to whom he yielded up great part of the conquests of his predecessors; and from generosity, or policy, he remitted the debts of the Roman people, which, according to the calculation of those who have reduced them to modern money, amounted to 22,500,000 golden crowns; and he burnt all the bonds and obligations relating to those debts, that the people might be under no apprehension of being called to an account for them afterwards. There are medals in commemoration of this fact, in which he is represented holding a flambeau in his hand, to set fire to all those bonds which he had made void. He went to visit all the provinces; and did not return to Rome till the year 118, when the senate decreed him a triumph, and honoured him with the title of Father of his country; but he refused both, and desired that Trajan's image might triumph. No prince travelled more than Adrian; there being hardly one province in the empire which he did not visit. In 120 he went into Gaul; from thence he went over to Britain, in order to subdue the Caledonians, who were making continual incursions into the provinces. Upon his arrival, they retired towards the north: he advanced however as far as York, where he was diverted from his intended course.

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quest by the description some old soldiers he found there, who had served under Agricola, gave him of the country. In hopes, therefore, of keeping them quiet by enlarging their bounds, he delivered up to the Caledonians all the lands lying between the two Friths and the Tyne; and at the same time, to secure the Roman province from their future incursions, built the famous wall which still bears his name (A). Having thus settled matters in Britain, he returned to Rome, where he was honoured with the title of Restorer of Britain, as appears by some medals. He soon after went into Spain, to Mauritania, and at length into the East, where he quieted the commotions raised by the Parthians. After having visited all the provinces of Asia, he returned to Athens in 125, where he passed the winter, and was initiated in the mysteries of Eleusinian Ceres. He went from thence to Sicily, chiefly to view mount Ætna, contemplate its phenomena, and enjoy the beautiful and extensive prospect afforded from its top. He returned to Rome the beginning of the year 129; and, according to some, he went again, the same year, to Africa; and, after his return from thence, to the east. He was in Egypt in the year 132, revisited Syria the year following, returned to Athens in 134, and to Rome in 135. The persecution against the Christians was very violent under his reign; but it was at length suspended, in consequence of the remonstrances of Quadrat bishop of Athens, and Aristides, two Christian philosophers, who presented the emperor with some books in favour of the Christian religion. He conquered the Jews; and, by way of insult, erected a temple to Jupiter on Calvary, and placed a statue of Adonis in the manger of Bethlehem; he caused also the images of swine to be engraven on the gates of Jerusalem. At last he was seized with a dropsy, which vexed him to such a degree, that he became almost raving mad. A great number of physicians were sent for, and to the multitude of them he ascribed his death. He died at Baizæ in the 63^d year of his age, having reigned 21 years. The Latin verses (B) he addressed to his soul have been much criticised and variously interpreted. There are some fragments of his Latin poems extant, and there are Greek verses of his in the Anthology. He also wrote the history of

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his

(A) This work, though called by the Roman historians *murus*, which signifies a wall of stone, was only composed of earth covered with green turf. It was carried on from the Solway Frith, a little west of the village of Burgh on the Sands, in as direct a line as possible, to the river Tyne on the east, at the place where the town of Newcastle now stands; so that it must have been above 60 English, and near 70 Roman miles in length. It consisted of four parts: 1. The principal *agger*, mound of earth, or rampart, on the brink of the ditch. 2. The ditch on the north side of the rampart. 3. Another rampart on the south side of the principal one, about five paces distant from it. 4. A large rampart on the north side of the ditch.—This last was probably the military way to the line of forts on this work: it was so to those formerly built by Agricola; and if it did not serve the same purpose in this, there must have been no military way attending it.—The fourth rampart might serve for an inner defence in case the enemy should beat them from any part of the principal rampart, or it might be designed to protect the soldiers from any sudden attack of the provincial Britons.—For many ages, this work hath been in so ruinous a condition, that it is impossible to discover its original dimensions with certainty. From their appearance it seems probable that the principal rampart was at least 30 or 35 feet high, and the fourth one not much less; but the north one was considerably lower. From the dimensions of the ditch taken as it passes through a lime-stone quarry near Harlow hill, it appears to have been 9 feet deep, and 11 wide at the top, but it becomes narrower at the bottom. The north rampart was about 50 feet distant from the ditch.

(B) The verses are these:

Animula vagula, blandula,
Hospes, comique corporis,
Quæ nunc abibis in loca
Pallidula, rigida, nudula,
Nec, ut soles, dabis jocos?

Thus translated by Mr Pope:

Ah! fleeting spirit! wand'ring fire,
That long hast warm'd my tender breast,
Must thou no more this frame inspire?
No more a pleasing cheerful guest?
Whither, ah! whither art thou flying?
To what dark undiscover'd shore?
Thou seem'st all trembling, shiv'ring, dying,
And wit and humour are no more!

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* Vide *Spartan*, in *Adrian*.

his own life : to which, however, he did not chuse to put his name ; but that of Phlegon, one of his freedmen, a very learned person, was prefixed to it *. He had great wit, and an extensive memory. He understood the sciences perfectly well ; but was very jealous of others who excelled in them. He was also cruel, envious, and lascivious. Antoninus his successor obtained his apotheosis ; and prevented the rescission of his acts, which the senate once intended.

ADRIAN IV. (Pope), the only Englishman who ever had the honour of sitting in the papal chair. His name was Nicholas Brekepere ; and he was born at Langley, near St Alban's, in Hertfordshire. His father having left his family, and taken the habit of the monastery of St Alban's, Nicholas was obliged to submit to the lowest offices in that house, for daily support. After some time, he desired to take the habit in that monastery, but was rejected by the abbot Richard. Upon this, he resolved to try his fortune in another country, and accordingly went to Paris ; where, though in very poor circumstances, he applied himself to his studies with great assiduity, and made a wonderful proficiency. But having still a strong inclination to a religious life, he left Paris, and removed to Provence, where he became a regular clerk in the monastery of St Rufus. He was not immediately allowed to take the habit ; but passed some time, by way of trial, in recommending himself to the monks by a strict attention to all their commands. This behaviour, together with the beauty of his person, and prudent conversation, rendered him so acceptable to those religious, that after some time they intreated him to take the habit of the canonical order. Here he distinguished himself so much by his learning and strict observance of the monastic discipline, that, upon the death of the abbot, he was chosen superior of that house ; and we are told that he rebuilt that convent. Pope Eugenius III. being apprised of the great merit of Nicholas, and thinking he might be serviceable to the church in a higher station, created him cardinal-bishop of Alba in 1146. In 1148, his Holiness sent him legate to Denmark and Norway ; where, by his fervent preaching and diligent instructions, he converted those barbarous nations to the Christian faith ; and erected Upsal into an archiepiscopal see. When he returned to Rome, he was received by the pope and cardinals with great marks of honour : and Pope Anastasius, who succeeded Eugenius, happening to die at this time, Nicholas was unanimously chosen to the holy see, in November 1154, and he took the name of *Adrian*. When the news of his promotion reached England, king Henry II. sent Robert abbot of St Alban's, and three bishops, to Rome, to congratulate him on his election ; upon which occasion Adrian granted very considerable privileges to the monastery of St Alban's, particularly an exemption from all episcopal jurisdiction, excepting to the see of Rome. Adrian, in the beginning of his pontificate, boldly withstood the attempts of the Roman people to recover their ancient liberty under the consuls, and obliged those magistrates to abdicate their authority, and leave the government of the city to the pope. In 1155, he drove the heretic Arnaud * of Breffe, and his followers, out of Rome. The same year he excommunicated William king of Sicily, who ravaged the territories of the church,

and absolved that prince's subjects from their allegiance. About the same time, Frederic king of the Romans, having entered Italy with a powerful army, Adrian met him near Sutrium, and concluded a peace with him. At this interview, Frederic consented to hold the pope's stirrup whilst he mounted on horseback. After which, his holiness conducted that prince to Rome, and in St Peter's church placed the imperial crown on his head, to the great mortification of the Roman people, who assembled in a tumultuous manner, and killed several of the Imperialists. The next year a reconciliation was brought about between the pope and the Sicilian king, that prince taking an oath to do nothing farther to the prejudice of the church, and Adrian granting him the title of *king of the two Sicilies*. He built and fortified several castles, and left the papal dominions in a more flourishing condition than he found them. But notwithstanding all his success, he was extremely sensible of the inquietudes attending so high a station ; and declared to his countryman John of Salisbury, that all the former hardships of his life were more amusements to the misfortunes of the popedom ; that he looked upon St Peter's chair to be the most uneasy seat in the world ; and that his crown seemed to be clapped burning on his head †. He died September 1. 1159, in the fourth year and tenth month of his pontificate ; and was buried in St Peter's church, near the tomb of his predecessor Eugenius.—There are extant several letters, and some homilies, written by Pope Adrian.

ADRIAN, cardinal priest, of the title of St Chrysgonus, was a native of Cornetto in Tuscany. Innocent VIII. sent him nuncio into Scotland and into France ; and after he had been clerk and treasurer of the apostolic chamber, pope Alexander VI. whose secretary he had been, honoured him with the cardinal's hat. His life was a continued scene of odd alterations. He narrowly escaped death the day Alexander VI. poisoned himself by mistake. Afterward he drew upon himself the hatred of Julius II. so that he was obliged to go and hide himself in the mountains of Trent. Having been recalled by Leo X. he was so ungrateful, that he engaged in a conspiracy against him. The pope pardoned his fault : but the cardinal, not caring to trust to this, made his escape, and it could never be known exactly what was become of him. He was one of the first that effectually reformed the Latin style. He studied Cicero with great success, and made many excellent observations on the propriety of the Latin tongue. The treatise he composed *De Sermone Latino*, is a proof of this. He had begun a Latin translation of the Old Testament. He wrote *De Vera Philosophia* : This treatise was printed at Cologn 1548.

ADRIAN VI. (Pope), was born at Utrecht in 1459. His father was not able to maintain him at school, but he got a place at Louvain in a college in which a certain number of scholars were maintained *gratis*. It is reported that he used to read in the night-time by the light of the lamps in the churches or streets. He made a considerable progress in all the sciences ; led an exemplary life ; and there never was a man less intriguing and forward than he was. He took his degree of doctor of divinity at Louvain ; was soon after made canon of St Peter's, and professor of divinity at Utrecht, and then dean of St Peter's and vice-chancellor of the university.

† Baronius, Annal. tom. xii. an. 1154.

* See Arnaud.

Adriani
||
Adrianople

versity. He was obliged to leave an academical life, to be tutor to the archduke Charles. This young prince made no great progress under him; however, never was a tutor more considerably rewarded; for it was by Charles V.'s credit he was raised to the papal throne. Leo X. had given him the Cardinal's hat in 1517. After this pope's death, several cabals in the conclave ended in the election of Adrian, with which the people of Rome were very much displeased. He would not change his name, and in every thing he shewed a great dislike for all ostentation and sensual pleasures, though such an aversion had been long ago out of date. He was very partial to Charles V. and did not enjoy much tranquillity under the triple crown. He lamented much the wicked morals of the clergy, and wished to establish a reformation of manners among them. He died Sept. 14. 1523.

ADRIANI (Joanni Battista) was born of a patrician family at Florence, in 1511. He wrote a History of his own Times, in Italian; which is a continuation of Guicciardini, beginning at the year 1536; to which Thuanus acknowledges himself greatly indebted: beside which, he composed six funeral orations, on the emperor Charles V. and other noble personages; and is thought to have been the author of a long letter on ancient painters and sculptors, prefixed to the third volume of Vasari. He died at Florence in 1579.

ADRIANISTS, in ecclesiastical history, a sect of heretics divided into two branches; the first were disciples of Simon Magus, and flourished about the year 34. Theodoret is the only person who has preserved their name and memory; but he gives us no account of their origin. Probably this sect, and the six others which sprung from the Simonians, took their name from the particular disciples of Simon. The second were the followers of Adrian Hamstead, the anabaptist; and held some particular errors concerning Christ.

ADRIANOPLE, a city of Turkey in Europe, in the province of Romania, and the see of an archbishop under the patriarch of Constantinople. It is about seven or eight miles in circumference, including the old city and some gardens. The houses are low, mostly built of mud and clay, and some of brick; and the streets are exceeding dirty. The walls and towers are in a great measure fallen to decay. However, there is a beautiful bazar, or market, half a mile long, called Ali Basia. It is a vast arched building, with six gates, and three hundred and sixty-five well-furnished shops, kept by Turks, Armenians, and Jews, who pay five crowns a-month for each shop. The number of inhabitants of all nations and religions may be about a hundred thousand; but it is dear living here, because the provisions are brought from distant places. The air is wholesome, and the country very pleasant in the summer time, on account of the river and streams that run near and about the city; the chief of which is the Mariza. These promote and preserve the verdure of the gardens, meadows, and fields, for a considerable part of the year. In the winter there is plenty of game. Near the principal bazar there is another, about a mile in length, covered with boards, with holes on each side to let in the light. It is full of good shops, which contain all kinds of commodities. Sultan Selim's mosque stands on the side of a hill, in the midst of the city; and hence this magnificent structure may be seen on all

Adsidella
||
Ad Ventrem.

sides. Every thing made of gold and silver, jewels, pistols, scimitars, &c. are sold in another part of the city, called by travellers the *bizestein*, though it differs little from a bazar. This contains about two hundred shops, and is covered like the former: but the covering is supported by two rows of large pillars. The grand vizier's palace is nothing more than a convenient house, after the Turkish manner of building. The emperor's seraglio is a regular structure, in a plain near the river Tungia. It is two miles in compass, and has seven gates, besides those of the gardens, which are several miles in circumference. The city is governed by a mullah cadi, who has an absolute authority both in civil and criminal matters. In the time of the plague, or war, the grand signior sometimes resides here. The Turks took this city from the Greeks in 1362, and made it the capital of the empire, till Mahomet II. took Constantinople in 1453. E. Long. 26. 27. Lat. 41. 45.

ADSIDELLA, in antiquity, the table at which the flames sat during the sacrifices.

ADSTRICTION, among physicians, a term used to denote the rigidity of any part.

ADUACA, (Antonine;) or *ATUACA*, contracted from *Atuacua*, (Cæsar;) anciently a large and famous city of the Tungri; now a small and inconsiderable village, called *Tongeren*, in the bishoprick of Liege, to the north-west of the city of Liege, in the territory of Haspengow, on the rivulet Jecker, that soon after falls into the Maefe. E. Long. 5. 22. Lat. 50. 54.

ADVANCE, in the mercantile style, denotes money paid before goods are delivered, work done, or business performed.

ADVANCED, in a general sense, denotes something posited or situated before another. Thus,

ADVANCED *Ditch*, in fortification, is that which surrounds the glacis or esplanade of a place.

ADVANCED *Guard*, or *Vanguard*, in the art of war, the first line or division of an army, ranged or marching in order of battle; or, it is that part which is next the enemy, and marches first towards them.

ADVANCED *Guard*, is more particularly used for a small party of horse stationed before the main-guard.

ADVANCER, among sportsmen, one of the starts, or branches of a buck's attire, between the back antler and the palm.

ADUAR, in the Arabian and Moorish customs, a kind of ambulatory village, consisting of tents, which these people remove from one place to another, as suits their convenience.

ADVENT, in the calendar, properly signifies the approach of the feast of the Nativity. It includes four Sundays, which begin on St Andrew's day, or on the Sunday before or after it. During advent, and to the end of the Octaves of Epiphany, the solemnizing of marriage is forbid without a special licence. It is appointed to employ the thoughts of Christians on the first advent or coming of Christ in the flesh, and his second advent or coming to judge the world. The primitive Christians practised great austerity during this season.

ADVENTITIOUS, an epithet applied to any thing that is accidental or fortuitous.

AD VENTREM *Inspiciendum*, in law, a writ by which a woman is to be searched whether she be with child

Adventure
Adultery.

Adultery.

child by a former husband, on her with-holding of lands from the next, failing issue of her own body.

ADVENTURE, in a general sense, some extraordinary or accidental event. It also denotes a hazardous or difficult undertaking.

Bill of ADVENTURE, among merchants, a writing signed by a merchant, testifying the goods mentioned in it to be shipped on board a certain vessel belonging to another person, who is to run all hazards; the merchant only obliging himself to account to him for the produce.

ADVENTURER, in a general sense, denotes one who hazards something.

ADVENTURERS, is particularly used for an ancient company of merchants and traders, erected for the discovery of lands, territories, trades, &c. unknown. The society of adventurers had its rise in Burgundy, and its first establishment from John duke of Brabant in 1248, being known by the name of the *The Brotherhood of St Thomas à Becket*. It was afterwards translated into England, and successively confirmed by Edward III. and IV. Richard III. Henry IV. V. VI. and VII. who gave it the appellation of *Merchant Adventurers*.

ADVERB, in grammar. See there, n° 52.

ADVERSARIA, among the ancients, a book of accounts, not unlike our journals or day-books. It is more particularly used for a kind of common-place-book. See *COMMON-PLACE-BOOK*.

ADVERSARY, a person who is an enemy to or opposes another.

ADVERSATIVE, in grammar, a word expressing some difference between what goes before and what follows it. Thus, in the phrase, *he is an honest man, but a great enthusiast*, the word *but* is an adversative conjunction.

ADVERSATOR, in antiquity, a servant who attended the rich in returning from supper, to give them notice of any obstacles in the way, at which they might be apt to stumble.

ADVERTISEMENT, in a general sense, denotes any information given to persons interested in an affair; and is more particularly used for a brief account of an affair inserted in the public papers, for the information of all concerned.

ADULE, or **ADULIS**, (anc. geogr.) a town of Egypt built by fugitive slaves, distant from its port on the Red Sea twenty stadia. Pliny calls the inhabitants *Adulites*. The epithet is either *Adulitanus*; as, *Monumentum Adulitanum*, or the pompous inscription of the statue of Ptolemy Euergetes, published by Leo Alatus at Rome in 1631, and to be found in Spon and Theronot: *Or, Adulicus*; as *Adulicus Sinus*, a part of the Red Sea.

ADULT, an appellation given to any thing that is arrived at maturity: Thus we say, an adult person, an adult plant, &c. Among civilians, it denotes a youth between 14 and 25 years of age.

ADULTERATION, the act of debasing, by an improper mixture, something that was pure and genuine.

ADULTERY, an unlawful commerce between one married person and another, or between a married and unmarried person.

Punishments have been annexed to adultery in most ages and nations, though of different degrees of severity.

In many it has been capital; in others venial, and attended only with slight pecuniary mulcts. Some of the penalties are serious, and even cruel; others of a jocose and humorous kind. Even contrary things have been enacted as punishments for adultery. By some laws, the criminals are forbid marrying together, in case they became single; by others, they are forbid to marry any besides each other; by some, they are incapacitated from ever committing the like crime again; by others, they are glutted with it till it becomes downright nauseous.

Among the rich Greeks, adulterers were allowed to redeem themselves by a pecuniary fine; the woman's father, in such cases, returned the dower he had received from her husband, which some think was refunded by the adulterer. Another punishment among those people was, putting out the eyes of adulterers.

The Athenians had an extraordinary way of punishing adulterers, called *παράκλησις ἀπορρογιστική*, practised at least on the poorer sort who were not able to pay the fines. This was an awkward sort of empalement, performed by thrusting one of the largest radishes up the anus of the adulterer, or, in defect thereof, a fish with a large head, called *mugil*, mullet. Alcæus is said to have died this way, though it was doubted whether the punishment was reputed mortal. Juvenal and Catullus speak of this custom, as received also among the Romans, though not authorized by an express law, as it was among the Greeks.

There are various conjectures concerning the ancient punishment of Adultery among the Romans. Some will have it to have been made capital by a law of Romulus, and again by the twelve tables. Others, that it was first made capital by Augustus; and others, not before the emperor Constantine. The truth is, the punishment in the early days was very various, much being left to the discretion of the husband and parents of the adulterous wife, who exercised it differently, rather with the silence and countenance of the magistrate, than any formal authority from him. Thus we are told, the wife's father was allowed to kill both parties, when caught in the fact, provided he did it immediately, killed both together, and as it were with one blow. The same power ordinarily was not indulged the husband, except the crime were committed with some mean or infamous person; tho', in other cases, if his rage carried him to put them to death, he was not punished as a murderer. On many occasions, however, revenge was not carried so far; but mutilating, castrating, cutting off the ears, noses, &c. served the turn. The punishment allotted by the *lex Julia*, was not, as many have imagined, death; but rather banishment, or deportation, being interdicted fire and water: though Octavius appears, in several instances, to have gone beyond his own law, and to have put adulterers to death. Under Macrinus, many were burnt at a stake. Constantine first by law made the crime capital. Under Constantine and Constant, adulterers were burnt, or sewed in sacks and thrown into the sea. Under Leo and Marcian, the penalty was abated to perpetual banishment, or cutting off the nose. Under Justinian, a further mitigation was granted; at least in favour of the wife, who was only to be scourged, lose her dower, and be shut up in a monastery: after two years, the husband was at liberty to take her back again; if he refused, she was shaven,

Adultery,
Advocate.

ven, and made a nun for life: But it still remained death in the husband. The reason alleged for this difference is, that the woman is the weaker vessel. Mattheus declaims against the empress Theodora, who is supposed to have been the cause of this law, as well as of others procured in favour of the sex from that emperor.

Under Theodosius, women convicted of this crime were punished after a very singular manner, *viz.* by a public confutation; being locked up in a narrow cell, and forced to admit to their embraces all the men that would offer themselves. To this end, the gallants were to dress themselves on purpose, having several little bells fastened to their clothes, the tinkling of which gave notice to those without of every motion. This custom was again abolished by the same prince.

In Britain, adultery is reckoned a spiritual offence, that is, cognizable by the spiritual courts. The common law takes no farther notice of it, than to allow the party grieved an action and damages. This practice is often censured by foreigners, as making too light of a crime, the bad consequences of which, public as well as private, are so great. But perhaps this penalty, by civil action, is more wisely calculated to prevent the frequency of the offence, which ought to be the end of all laws, than a severer punishment. He that by a judgment of law is, according to circumstances, stripped of great part of his fortune, thrown into prison till he can pay it, or forced to fly his country, will, no doubt, in most cases, own, that he pays dearly for his amusement*.

* See Law,
o lviii. 3.
lix. 20.
lxvi. 24.

ADVOCATE, among the Romans, a person who undertook the defence of causes. The term is still kept up in all countries where the civil law obtains.

KING'S ADVOCATE, is the principal crown-lawyer in Scotland. His business is to act as a public prosecutor, and to plead in all causes that concern the crown; but particularly in such as are of a criminal nature. The office of king's advocate is not very ancient: It seems to have been established about the beginning of the 16th century. Originally he had no power to prosecute crimes without the concurrence of a private party; but, in the year 1597, he was empowered to prosecute crimes at his own instance.

FACULTY OF ADVOCATES, in Scotland, a respectable body of lawyers, who plead in all causes before the Courts of Session, Judiciary, and Exchequer. They are also intitled to plead in the house of peers, and other supreme courts in England.

In the year 1660, the faculty founded a library upon a very extensive plan, suggested by that learned and eminent lawyer Sir George McKenzie of Rosehaugh, advocate to King Charles II. and King James VII. who enriched it with many valuable books. It has been daily increasing since that time, and now contains not only the best collection of law-books in Europe, but a very large and select collection of books on all subjects. Besides, this library contains a great number of original manuscripts, and a vast variety of Jewish, Grecian, Roman, Scots, and English coins and medals.

A candidate for the office of an advocate undergoes three several trials: The first is in Latin, upon the civil law and Greek and Roman antiquities; the second, in English, upon the municipal law of Scotland; and, in the third, he is obliged to defend a Latin thesis, which is impugned by three members of the faculty.

Immediately before putting on the gown, the candidate makes a short Latin speech to the lords, and then takes the oaths to the government and *de fide*li.

The faculty at present consists of above 200 members. As an advocate or lawyer is esteemed the gentlest profession in Scotland, many gentlemen of fortune take the degree of advocate, without having any intention of practising at the bar. This circumstance greatly increases their number, gives dignity to the profession, and enriches their library and public fund. It is from this respectable body, that all vacancies on the bench are generally supplied.

FISCAL ADVOCATE, *sicci advocatus*, in Roman antiquity; an officer of state under the Roman emperors, who pleaded in all causes wherein the *Fiscus*, or private treasury, was concerned.

CONFISSORIAL ADVOCATES; officers of the consistory at Rome, who plead in all oppositions to the disposal of benefices in that court: they are ten in number.

ADVOCATE of a City, in the German polity, a magistrate appointed in the Emperor's name to administer justice.

BILL OF ADVOCATION, in Scots law, a writing drawn up in the form of a petition, whereby a party, in an action before an inferior court, applies to the supreme court, or court of Session, for calling the action from the inferior court before itself*.

LETTERS OF ADVOCATION, in Scots law, the decree or warrant of the court of Session upon cognisance of the facts set forth in the bill, drawn up in the form of a summons, and passing under the signet, discharging the inferior judge and all others from further procedure in the cause, and advocating it to itself*.

* See Law,
No civl. 16,
17.

ADVOW, in law, signifies the patron of a church, or he who has a right to present to a benefice.

PARAMOUNT ADVOWEE, is used for the king, as being the highest patron.

ADVOWZON, in law, is the right of patronage, or presenting to a vacant benefice.

ADUST, among physicians, a term applied to the blood, &c. when too hot and fiery.

ADY, in natural history, a name given to the palm-tree of the island of St Thomas. It is a tall tree, with a thick, bare, upright stem, growing single on its root, of a thin light timber, and full of juice. The head of this tree shoots into a vast number of branches, which being cut off, or an incision being made therein, afford a great quantity of sweet juice, which fermenting supplies the place of wine among the Indians. The fruit of this tree is called by the Portuguese *Caryocoe* and *Carissæ*; and by the black natives, *Banga*. This fruit is of the size and shape of a lemon, and contains a kernel, which is good to eat. The fruit itself is eat roasted, and the raw kernels are often mixed with mandioc meal. These kernels are supposed very cordial. An oil is also prepared from this fruit, which answers the purpose of oil or butter. This oil is also used for anointing blisters and contracted parts of the body.

ADYTUM, in pagan antiquity, the most retired and sacred place of their temples, into which none but the priests were allowed to enter.

ADZE, or **ADDIS**, a cutting tool of the ax kind, chiefly used by coopers.

ÆACEA, in Grecian antiquity, solemn festivals and games celebrated at Ægina, in honour of Æacus.

ÆACUS.

Advocate
||
Æaces.

* See the
preceding
article.

Æacus
Æge.

ÆACUS, the son of Jupiter by *Ægina*. When the ile of *Ægina* was depopulated by a plague, his father, in compassion to his grief, changed all the ants upon it into men and women, who were called *Myrmidons*, from *μυρμήκας*, an ant. The foundation of the fable is said to be, that when the country had been depopulated by pirates, who forced the few that remained to take shelter in caves, *Æacus* encouraged them to come out, and by commerce and industry recover what they had lost. His character for justice was such, that, in a time of universal drought, he was nominated by the Delphic oracle to intercede for Greece, and his prayer was answered. The Pagans also imagined that *Æacus*, on account of his impartial justice, was chosen by Pluto one of the three judges of the dead; and that it was his province to judge the Europeans.

ÆCHMALOTARCHA, in Jewish antiquity, a title given to the principal leader or governor of the Hebrew captives residing in Chaldea, Assyria, and the neighbouring countries. This magistrature was called by the Jews *rosch-galath*, i. e. the chief of the captivity.

ÆDES, in Roman antiquity, besides its more ordinary signification of a house, likewise signified an inferior kind of temple, consecrated to some deity.

ÆDICULA, a term used to denote the inner part of the temple, where the altar and statue of the deity stood.

ÆDILATE, the office of *ædile*, sometimes called *Ædilitas*. See the next article.

ÆDILE, *ædilis*, in Roman antiquity, a magistrate whose chief business was to superintend buildings of all kinds, but more especially public ones, as temples, aqueducts, bridges, &c. To the *ædiles* likewise belonged the care of the highways, public places, weights and measures, &c. They also fixed the prices of provisions, took cognizance of debauches, punished lewd women, and such persons as frequented gaming houses. The custody of the plebs, or orders of the people, was likewise committed to them. They had the inspection of comedies and other pieces of wit; and were obliged to exhibit magnificent games to the people, at their own expence, whereby many of them were ruined. At first the *ædiles* were only two in number, and chosen from among the common people; but these being unable to support the expence of the public shows, two more were created out of the patrician order: these last took upon themselves all the charges of the games, and were called *Ædiles Curules*; or *Maiores*, as the two plebeians were denominated *Minores*. Julius Cæsar, in order to ease these four, created two others, who were called *Ædiles Cereales*, as having the inspection of all manner of grain committed to their care. There were also *ædiles* in the municipal cities, who had much the same authority as those in Rome.

ÆDITUUS, in Roman antiquity, an officer belonging to the temple, who had the charge of the offerings, treasure, and sacred utensils. The female deities had a woman officer of this kind called *Æditua*.

ÆGAGROPILA, a ball composed of a substance resembling hair, generated in the stomach of the chamois-goat. This ball is of the same nature with those found in cows, hogs, &c.

ÆGÆ, or *ÆGÆA*, (anc. geogr.) the name of *Ægeffa*, so called from the following adventure: Cara-

nus, the first king of Macedonia, being ordered by the oracle to seek out a settlement in Macedonia, under the conduct of a flock of goats, surprised the town of *Ædeffa*, during a thick fog and rainy weather, in following the goats, that fled from the rain; which goats ever after, in all his military expeditions, he caused always to precede his standard; and in memory of this he called *Ædeffa Ægæa*, and his people *Ægæædæ*. And hence probably, in the prophet Daniel, the he-goat is the symbol of the king of Macedon.

ÆGEAN SEA, (anc. geogr.) now the *Archipelago*, a part of the Mediterranean, separating Europe from Asia and Africa; washing, on the one hand, Greece and Macedonia; on the other, Caria and Ionia. The origin of the name is greatly disputed. Festus advances three opinions: one, that it is so called from the many islands therein, at a distance appearing like so many goats; another, because *Ægæa* queen of the Amazons perished in it: a third opinion is, because *Ægeus*, the father of Theseus threw himself headlong into it.

ÆGEUS, in fabulous history, was king of Athens, and the father of Theseus. The Athenians having basely killed the son of Minos, king of Crete, for carrying away the prize from them, Minos made war upon the Athenians; and being victorious, imposed this severe condition on *Ægeus*, that he should annually send into Crete, seven of the noblest of the Athenian youths, chosen by lot, to be devoured by the Minotaur. On the fourth year of this tribute, the choice fell on Theseus; or, as others say, he himself intreated to be sent. The king, at his son's departure, gave orders, that as the ship sailed with black sails, it should return with the same in case he perished; but, if he became victorious, he should change them into white. When Theseus returned to Crete, after killing the Minotaur, and forgot to change the sails in token of his victory, according to the agreement with his father; the latter, who watched the return of the vessel, supposing by the black sails that his son was dead, cast himself headlong into the sea, which afterwards obtained the name of the *Ægean Sea*. The Athenians decreed *Ægeus* divine honours; and sacrificed to him as a marine deity, the adopted son of Neptune.

ÆGIAS, among physicians, a white speck on the pupil of the eye, which occasions a dimness of sight.

ÆGIDA, (Pliny); now *Capo d'Istria*, the principal town in the north of the territory of Istria, situated in a little island, joined to the land by a bridge. In an inscription, (Gruter,) it is called *Ægidis Insula*. E. Long. 14. 20. Lat. 45. 50. It was afterwards called *Justinopolis*, after the emperor Justinus.

ÆGILOPS; the name of a tumour in the eye, which frequently degenerates into a fistula lacrymalis.

ÆGILOPS, *WILD FESTUC*, a genus of the monœcia order, belonging to the polygamia class of plants, is a native of Italy and some other parts of Europe. The root is composed of a few short white fibres: the plant grows to about a foot high: the stalk is round, hollow, jointed, and has two or three long, narrow, grassy leaves on it, hairy at the edges: at the top of the stalk grows a short spike consisting of two or three little rigid clusters of flowers: the seeds are large; and somewhat like barley, but flatter.

ÆGIMURUS, (anc. geogr.) an island on the bay of

Ægean Sea
Ægimurus.

Ægina
Ægluchs.

of Carthage, about thirty miles distant from that city, (Livij;) now the *Galecta*: This island being afterwards sunk in the sea, two of its rocks remained above water, which were called *Aræ*, and mentioned by Virgil, because the Romans and Carthaginians entered into an agreement or league to settle their mutual boundaries at these rocks.

ÆGINA, in fabulous history, the daughter of Ætopus, king of Bœotia, was beloved by Jupiter, who debauched her in the similitude of a lambent flame, and then carried her from Epidaurus to a desert island called Oenope, which afterwards obtained her own name.

ÆGINA, (anc. geogr.) now *Engin*, an island on the Saronic Bay, or Bay of Engia, twenty miles distant from the Piræus, formerly vying with Athens for naval power, and at the sea-fight of Salamin disputing the palm of victory with the Athenians. It was the country and kingdom of Æacus, who called it *Ægina* from his mother's name, it being before called *Oenopia*, (Ovid.) The inhabitants were called *Æginetæ*, and *Æginensîs*. The Greeks had a common temple in Ægina. The soil was gleby underneath, but rocky on the surface; yet yielding plenty of barley. The *Æginetæ* applied to commerce; and were the first who coined money, called Νμισμα Ἀγιναιον; hence *Ægineticum æs*, formerly in great repute. The inhabitants were called *Myrmidones*, or a nation of ants, from their great application to agriculture. See *ÆACUS*.

ÆGINETÆ (Paulus), a celebrated surgeon of the island of Ægina, from whence he derived his name. According to Mr Le Clerc's calculation, he lived in the fourth century; but Abulpharagius the Arabian, who is allowed to give the best account of those times, places him with more probability in the seventh. His knowledge in surgery was very great, and his works are deservedly famous. Fabricius ab Aquapendente has thought fit to transcribe him in a great variety of places. Indeed the doctrine of Paulus Æginetæ, together with that of Celsus, and Albucasis, make up the whole text of this author. He is the first writer who takes notice of the cathartic quality of rhubarb; and, according to Dr Milward, is the first in all antiquity who deserves the title of a man-midwife.

ÆGIPAN, in heathen mythology, a denomination given to the god Pan, because he was represented with the horns, legs, feet, &c. of a goat.

ÆGIS, in heathen mythology, the shield which Jupiter presented to Minerva, after his having covered it with the skin of Amalthea, the goat who suckled him. Afterwards Minerva fixed Medusa's head in the middle of the ægis, which by this means obtained the power of turning all who saw it into stone.

ÆGISTHUS, son of Thyestes by his own daughter Pilopeia, who, to conceal her shame, exposed him in the woods: some say he was taken up by a shepherd, and suckled by a goat, whence he was called *Ægithus*. He corrupted Clytemnestra the wife of Agamemnon; and with her assistance slew her husband, and reigned seven years in Mycenæ. He was, together with Clytemnestra, slain by Orestes. Pompey used to call Julius Cæsar *Ægithus*, on account of his having corrupted his wife Mutia, whom he afterward put away, though he had three children by her.

ÆGIUCHUS, in heathen mythology, a surname of

Jupiter, given him on account of his having been suckled by a goat.

ÆGIUM, (anc. geogr.) a town of Achaia Propria, five miles from the place where Helice stood, and famous for the council of the Achæans, which usually met there, on account either of the dignity, or commodious situation of the place. It was also famous for the worship of *Οὐρανὸς Ζεύς*, *Conventional Jupiter*, and of *Panachean Ceres*. The territory of Ægium was watered by two rivers, viz. the Phoenix and Meganitas. The epithet is *Ægienfis*. There is a coin in the cabinet of the king of Prussia, with the inscription *ΑΓΓΙ*, and the figure of a tortoise, which is the symbol of Peloponnesus, and leaves no doubt as to the place where it was struck.

ÆGLEFINUS, or HADDOCK, in ichthyology, a species of the gadus. See *GADUS*.

ÆGOPODIUM, SMALL WILD ANGELICA, or GOBTWORT, a genus of the digynia order, belonging to the pentandria class of plants, is very common under hedges, and about gardens; the leaves resemble those of Angelica, and it carries small white flowers. Its roots run io fast, as to render it a very troublesome weed.

ÆGOS POTAMOS, (anc. geogr.) a river in the Thracian Cheronefus, falling with a south-east course into the Hellespont, to the north of Sestos; also a town, station, or road for ships, at its mouth. Here the Athenians, under Conon, through the fault of his colleague Isocrates, received fo fatal a blow from the Lacedæmonians under Lyfander, in a sea-engagement, as to cost them their liberty and their all.

ÆGYPT. See *EGYPT*.

ÆGYPTIACUM, in pharmacy, the name of several detergent ointments. See *PHARMACY*, n° 992, 993.

ÆGYPTILLA, in natural history, the name of a stone described by the ancients, and said, by some authors, to have the remarkable quality of giving water the colour and taste of wine. This seems a very imaginary virtue, as are indeed too many of those in former ages attributed to stones. The descriptions left us of this remarkable fossil tell us, that it was variegated with, or composed of, veins of black and white, or black and blueish, with sometimes a plate or vein of whitish red. The authors of these accounts seem to have understood by this name the several stones of the onyx, fardonyx, and camæa kind, all which we have at present common among us, but none of which possess any such strange properties.

ÆGYPTUS, (fab. hist.) was the son of Beleus, and brother of Danaus. See *BELIDES*.

ÆINATTÆ, in antiquity, a denomination given to the senators of Miletus, because they held their deliberations on board a ship, and never returned to land till matters had been agreed on.

ÆLIAN (Claudius), born at Præneste in Italy. He taught rhetoric at Rome, according to Perizonius, under the emperor Alexander Severus. He was surnamed *Μαλιγλωσθς*, Honey-mouth, on account of the sweetness of his style. He was likewise honoured with the title of Sophist, an appellation in his days given only to men of learning and wisdom. He loved retirement, and devoted himself to study. He greatly admired and studied Plato, Aristotle, Isocrates, Plutarch, Homer, Anacreon, Archilochus, &c. and, though a Roman, gives

Ægium
Ælian.

ÆLI PONS gives the preference to the writers of the Greek nation. His two most celebrated works are, his Various History, and History of Animals. He composed likewise a book on Providence, mentioned by Euthatius; and another on Divine Appearances, or The Declarations of Providence. There have been several editions of his Various History.

ÆLI PONS, (anc. geogr.) one of the fortresses near the wall or rampart, or, in the words of the Notitia, through the line of the hither wall; built, as is thought, by Adrian*. Now Porteland, (Camden), in Northumberland, between Newcastle and Morpeth.

* See *Adrian*, (emperor.)

ÆLIUS PONS, now *il Ponte S. Angelo*, a stone-bridge at Rome, over the Tyber, which leads to the Burg and Vatican from the city, along Adrian's mole, built by the emperor Adrian.

ÆLFRED. See *ALFRED*.

ÆLURUS, in Egyptian mythology, the deity or god of cats; represented sometimes like a cat, and sometimes like a man with a cat's head. The Egyptians had so superstitious a regard for this animal, that the killing it, whether by accident or design, was punished with death: and Diodorus relates, that, in the time of extreme famine, they chose rather to eat one another, than touch these sacred animals.

ÆMILIUS (Paulus), the son of Lucius Paulus, who was killed at the battle of Cannæ, was twice consul. In his first consulate he triumphed over the Ligurians; and in the second subdued Perseus king of Macedonia, and reduced that country to a Roman province, on which he obtained the surname of Macedonicus. He returned to Rome loaded with glory, and triumphed for three days. He died 168 years before Christ.

ÆMILIUS (Paulus), a celebrated historian, born at Verona, who obtained such reputation in Italy, that he was invited into France by the cardinal of Bourbon, in the reign of Lewis XII. in order to write the history of the kings of France in Latin, and was given a canonry in the cathedral of Paris. He was near 30 years in writing that history, which has been greatly admired; and died at Paris on the 5th of May 1529.

ÆNARIA, (anc. geogr.) an island on the bay of Cumæ, or over-against Cumæ in Italy, (Pliny.) It is also called *Inarime*, (Virgil); and now *Ischia*: scarce three miles distant from the coast, and the promontory Misenus to the west; 20 miles in compass; called *Pithecia* by the Greeks. It is one of the Oenotrides, and fenced round by very high rocks, so as to be inaccessible but on one side; it was formerly famous for its earthen ware. See *ISCHIA*.

ÆNEAS, (fab. hist.) a famous Trojan prince, the son of Anchises and Venus. At the destruction of Troy, he bore his aged father on his back, and saved him from the Greeks; but being too solicitous about his son and household-gods, lost his wife Creusa in the escape. Landing in Africa, he was kindly received by queen Dido: but quitting her coast, he arrived in Italy, where he married Lavinia the daughter of king Latinus, and defeated Turnus, to whom he had been contracted. After the death of his father-in-law, he was made king of the Latins, over whom he reigned three years: but joining with the Aborigines, he was slain in a battle against the Tuscans. Virgil has rendered

the name of this prince immortal, by making him the hero of his poem.

ÆNEAS SYLVIVS, (Pope). See *PIUS II.*

ÆNEATORES, in antiquity, the musicians in an army, including those who played trumpets, horns, &c. The word is formed from *æneus*, on account of the brazen instruments used by them.

ÆNGINA, one of the islands of the Archipelago. It lies in the bay of Engia, and the town of that name contains about 800 houses and a castle; and near it are the ruins of a magnificent structure, which was probably a temple.

ÆNIGMA, denotes any dark saying, wherein some well-known thing is concealed under obscure language. The word is Greek, *Αἰνigma*, formed of *αἰνέω*, *obscure innuere*, to hint a thing darkly, and of *αἶνος*, an obscure speech or discourse. The popular name is *riddle*; from the Belgic *raeden*, or the Saxon *araethan*, to interpret. Fa. Bouhours, in the memoirs of Trevoux, defines an *ænigma*, A discourse, or painting, including some hidden meaning, which is proposed to be guessed.

Painted **ÆNIGMAS**, are representations of the works of nature, or art, concealed under human figures, drawn from history, or fable.

A Verbal **ÆNIGMA**, is a witty, artful, and abstruse description of any thing.—In a general sense, every dark saying, every difficult question, every parable, may pass for an *ænigma*. Hence obscure laws are called *Ænigmata Juris*. The alchemists are great dealers in the *ænigmatic* language, their processes for the philosophers stone being generally wrapped up in riddles: e. g. *Fac ex mare et femina circulum, inde quadrangulum, hinc triangulum, fac circulum, et habebis lapidem philosophorum*—F. Menckier has attempted to reduce the composition and resolution of *ænigmas* to a kind of art, with fixed rules and principles, which he calls the philosophy of *ænigmatic* images.

The Subject of an **ÆNIGMA**, or the thing to be concealed and made a mystery of, he justly observes, ought not to be such in itself; but, on the contrary, common, obvious, and easy to be conceived. It is to be taken, either from nature, as the heavens, or stars; or from art, as painting, the compass, a mirror, or the like.

The Form of **ÆNIGMAS** consists in the words, which, whether they be in prose or verse, contain either some description, a question, or a prosopopeia. The last kind are the most pleasing, inasmuch as they give life and action to things which otherwise have them not. To make an *ænigma*, therefore, two things are to be pitched on, which bear some resemblance to each other; as the sun, and a monarch; or a ship, and a house: and on this resemblance is to be raised a superstructure of contrarieties to amuse and perplex. It is easier to find great subjects for *ænigmas* in figures than in words, inasmuch as painting attracts the eyes and excites the attention to discover the sense. The subjects of *ænigmas* in painting, are to be taken either from history or fable: the composition here is a kind of metamorphosis, wherein, e. g. human figures are changed into trees, and rivers into metals. It is essential to *ænigmas*, that the history or fable, under which they are presented, be known to every body; otherwise it will be two *ænigmas* instead of one; the first of the history or fable, the second of the sense in which

Æneis
Ænigma.

it is to be taken. Another essential rule of the ænigma is, that it only admit of one sense. Every ænigma which is susceptible of different interpretations, all equally natural, is so far imperfect. What gives a kind of erudition to an ænigma, is the invention of figures in situations, gestures, colours, &c. authorized by passages of the poets, the customs of artists in statues, basso relievos, inscriptions, and medals.—In foreign colleges,

The explication of ÆNIGMAS makes a considerable exercise; and that one of the most difficult and amusing, where wit and penetration have the largest field.—By explaining an ænigma, is meant the finding a motto corresponding to the action and persons represented in a picture, taken either from history or mythology. The great art of this exercise consists in the choice of a motto, which either by itself, or the circumstances of time, place, person who speaks, or those before whom he is speaking, may divert the spectators, and furnish occasion for strokes of wit; also in shewing to advantage the conformities between the figure and thing figured, giving ingenious turns to the reasons employed to support what is advanced, and in artfully introducing pieces of poetry to illustrate the subject and awaken the attention of the audience.

As to the solution of ænigmas, it may be observed, that those expressed by figures are more difficult to explain than those consisting of words, by reason images may signify more things than words can; so that to fix them to a particular sense, we must apply every situation, symbol, &c. and without omitting a circumstance.—As there are few persons in history, or mythology, but have some particular character of vice or virtue, we are, before all things, to attend to this character, in order to divine what the figure of a person represented in a painting signifies, and to find what agreement this may have with the subject whereof we would explain it. Thus, if Proteus be represented in a picture, it may be taken to denote *inconstancy*, and applied either to a physical or moral subject, whose character is to be changeable; *e. g.* an almanack, which expresses the weather, the seasons, heat, cold, storms, and the like. The colours of figures may also help to unriddle what they mean: *white*, for instance, is a mark of innocence, *red* of modesty, *green* of hope, *black* of sorrow, &c. When figures are accompanied with *symbols*, they are less precarious; these being, as it were, the soul of ænigmas, and the key that opens the mystery of them. Of all the kinds of symbols which may be met with in those who have treated professedly on the subject, the only truly enigmatical are those of Pythagoras, which, under dark proverbs, hold forth lessons of morality; as when he says, *Statram ne transjilas*, to signify, Do no injustice.

But it must be added, that we meet with some ænigmas in history, complicated to a degree which much transcends all rules, and has given great perplexity to the interpreters of them. Such is that celebrated ancient one, *Ælia Lælia Crispis*, about which many of the learned have puzzled their heads. There are two exemplars of it: one found 140 years ago, on a marble near Bologna; the other in an ancient MS. written in Gothic letters, at Milan. It is controverted between the two cities, which is to be reputed the more authentic.

The Bononian Ænigma.

D. M.

*Ælia Lælia Crispis,
Nec vir, nec mulier,
Nec androgyna;
Nec puella, nec juvenis,
Nec anus;
Nec casta, nec meretrix,
Nec pudica;
Sed omnia:
Sublata
Neque fame, neque ferro,
Neque veneno;
Sed omnibus:
Nec celo, nec terris,
Nec aquis,
Sed ubique jacet.
Lucius Agatho Priscius,
Nec maritus, nec amator,
Nec necessarius;
Neque mærens, neque gaudens,
Neque fletus;
Hanc,
Nec molem, nec pyramidem,
Nec sepulchrum,
Sed omnia,
Scit et nescit, cui posuerit.*

That is to say, *To the gods* maner, *Ælia Lælia Crispis*, neither man, nor woman, nor hermaphrodite; neither girl, nor young woman, nor old; neither chaste, nor a whore; but all these: killed neither by hunger, nor steel, nor poison; but by all these: rests neither in heaven, nor on earth, nor in the waters; but every where. *Lucius Agatho Priscius*, neither her husband, nor lover, nor friend; neither sorrowful, nor joyful, nor weeping, certain, or uncertain, to whom he rears this monument, neither erects her a temple, nor a pyramid, nor a tomb, but all these. In the MS. at Milan, instead of *D. M.* we find *A. M. P. P. D.* and at the end the following addition:

*Hoc est sepulchrum intus cadaver non habens,
Hoc est cadaver sepulchrum extra non habens,
Sed cadaver idem est & sepulchrum.*

We find near 50 several solutions of this ænigma advanced by learned men. Marius Michael Angelus maintains *Ælia Lælia Crispis* to signify rain-water falling into the sea. Ri. Vitus first explained it of Niobe turned to a stone, afterwards of the rational soul, and afterwards of the Platonic idea; Jo. Turrius, of the *materia prima*; Fr. Schottus, of an eunuch; Nic. Bernardus, of the philosophers-stone, in which he is followed by Borrichius; Zach. Pontinus, of three human bodies in the same situation, and buried by three different men at the same time; Nescimondius, of a law-suit; Jo. Gaf. Gerartius, of love; Zu. Boxhornius, of a shadow; P. Terronus, of music; Fort Licetius, of generation, friendship, and privation; M. Ov. Montalbanus, of hemp; Car. Cæf. Malvasia, of an abortive girl promised in marriage; Pet. Mengulus, of the rule of chastity, prescribed by the founder of the military religion of St Mary; M. de Ciconia, of pope Joan; Heumannus, of Lot's wife; and lastly, J. C. S. an anonymous writer in the Leipzig Acts, of the Christian church.

Ætigma-
tophography
Æolus.

ÆNIGMATOGRAPHY, or ÆNIGMATOLOGY, the art of resolving or making ænigmas.

ÆOLIE INSULÆ, now *Isle di Lipari*, (anc. geogr.) seven islands, situated between Sicily and Italy, (Strabo, Diodorus Siculus, Mela); so called from Æolus, who reigned there about the time of the Trojan war. The Greeks call them *Hephasiades*; and the Romans, *Vulcaniæ*, from their fiery eruptions. They are also called *Liparaeum Insule*, from the principal island Lipara. Dionysius Periegetes calls them *Æoliæ*, because circumnavigable.

ÆOLIC, in a general sense, denotes something belonging to Æolis.

ÆOLIC *Dialecti*, among grammarians, one of the five dialects of the Greek tongue, agreeing in most things with the Doric dialect. See DORIC.

ÆOLIC *Verse*, in prosody, a verse consisting of an iambus, or spondee; then of two anapests, separated by a long syllable; and, lastly, of another syllable. Such as, *ὦ στήθεσσι conditor orbis*.

ÆOLIPILE, in hydraulics, is a hollow ball of metal, generally used in courses of experimental philosophy, in order to demonstrate the possibility of converting water into an elastic steam or vapour by heat. The instrument, therefore, consists of a slender neck, or pipe, having a narrow orifice inserted into the ball by means of a shouldered screw. This pipe being taken out, the ball is filled almost full of water, and the pipe being again screwed in, the ball is placed on a pan of kindled charcoal, where it is well heated, and there issues from the orifice a vapour, with prodigious violence and great noise, which continues till all the included water is discharged. The stronger the fire is, the more elastic and violent will be the steam; but care must be taken that the small orifice of the pipe be not, by any accident, stopped up; because the instrument would in that case infallibly burst in pieces, with such violence as may greatly endanger the lives of the persons near it. Another way of introducing the water is to heat the ball red-hot when empty, which will drive out almost all the air; and then by suddenly immersing it in water, the pressure of the atmosphere will force in the fluid, till it is nearly full. Des Cartes and others have used this instrument to account for the natural cause and generation of the wind: and hence it was called *Æolopila*; q. d. *pila Æoli*, the ball of Æolus or of the god of the winds.

ÆOLIS, or ÆOLIA, (anc. geogr.) a country of the Hither Asia, settled by colonies of Æolian Greeks. Taken at large, it comprehends all Troas, and the coast of the Hellespont to the Propontis, because in those parts there were several Æolian colonies: more strictly, it is situated between Troas to the north, and Ionia to the south. The people are called *Æoles*, or *Æoli*.

ÆOLIUM MAKE, (anc. geogr.) a part of the Egean sea, washing Æolis; called also *Mysium*, from Mysia. Now called, *Golfo di Smyrna*.

ÆOLUS, in heathen mythology, the god of the winds, is said to be the son of Jupiter by Aëta, or Sigefa, the daughter of Hippotus; or, according to others, the son of Hippotus by Meneclea, daughter of Hyllus king of Lipara. He dwelt in the island Strongyle, now called *Stromboli*, one of the seven islands called *Æolian* from their being under the dominion of Æolus. Others say, that his residence was

at Regium, in Italy; and others again place him in the island Lipara. He is represented as having authority over the winds, which he held enclained in a vast cavern, to prevent their continuing the devastations they had been guilty of before they were put under his direction. Mythologists explain the original of these fables, by saying, that he was a wife and good prince; and, being skilled in astronomy, was able, by the flux and reflux of the tides, and the nature of the volcano in the island Strongyle, to foretell storms and tempests.

Harp of Æolus, or the Æolian Lyre *.

ÆON, a Greek word, properly signifying the age or duration of any thing.

Æon, among the followers of Plato, was used to signify any virtue, attribute, or perfection: hence they represented the Deity as an assemblage of all possible æons; and called him *pleroma*, a Greek term signifying *fulness*. The Valentinians, who, in the first ages of the church, blended the conceits of the Jewish cabalists, the Platonists, and the Chaldean philosophers, with the simplicity of the Christian doctrine, invented a kind of Theogony, or Genealogy of Gods (not unlike that of Hesiod), whom they called by several glorious names, and all by the general appellation of *Æons*: among which they reckoned *Zen, Life, Æolus, Word, Monogenes, Only-begotten, Παρθενα, Fullness*; and many other divine powers and emanations, amounting in number to thirty: which they fancied to be successively derived from one another; and all from one self-originated deity, named *Bythus*, i. e. *profound or unsathomable*; whom they called likewise, *The most high and ineffable Father*. See VALENTINIANS.

ÆQUIMELIUM, in antiquity, a place in Rome, where stood the house of Spurius Mælius, who, by largesses corrupting the people, affected the supreme power: refusing to appear before the dictator Cincinnatus, he was slain by Servilius Ahala, master of the horse; his house was razed to the ground; and the spot on which it stood was called *Area Equimelii*. (Livy).

ÆRA. The point of time from whence any number of years is begun to be counted, is called a *period, æra, or epoch*. The word æra comes from the Latin *æs*, because the Romans marked their years with a kind of small brass nails. The difference between the terms *æra* and *epoch* is, that the æras are certain points fixed by some people, or nation; and the epochs are points fixed by chronologists and historians. The idea of an æra comprehends also a certain succession of years proceeding from a fixed point of time, and the epoch is that point itself. Thus the Christian æra began at the epoch of the birth of Jesus Christ *.

AERIAL, in a general sense, denotes something partaking of the nature of air; thus, aerial substance, aerial particles, &c.

AERIANS, in church-history, a branch of Arians, who, to the doctrines of that sect, added some peculiar dogmas of their own; as, that there is no difference between bishops and priests; a doctrine maintained by many modern divines, particularly of the presbyterian and reformed churches.

FLOS ÆRIS, among alchemists, small scales procured from copper melted by a strong heat; it is sometimes used for arguro or verdigrise.

AEROGRAPHY, signifies a description of the air.

AEROLOGY,

Æon
Ærography

* See Aërologia, n^o 10.

* See Chronology, N^o III. 1, 6, 7, 8, and Astronomy, n^o 314.

Aerology

Æschines.

AEROLOGY, an account of the nature and properties of the air.

AEROMANCY, a species of divination performed by means of air, wind, &c. See **DIVINATION**, n° 5.

AEROMETRY, the science of measuring the air. It comprehends not only the doctrine of the air itself, considered as a fluid body; but also its pressure, elasticity, rarefaction, and condensation. But the term is at present not much in use, this branch of natural philosophy being more frequently called Pneumatics *.

* See Pneumatics.

AEROPHYLACEA, a term used by naturalists for caverns or reservoirs of air, supposed to exist in the bowels of the earth.

AERSHOT, a town in the Netherlands, in the duchy of Brabant, and capital of the duchy of Aershot. It is seated on the river Demur, ten miles east of Malines or Mechlin, and eight north of Louvain. E. Lon. 5. 4. N. lat. 51. 15.

ÆRUGINOUS, in ornithology, the trivial name of a species of falco. See **FALCO**.

ÆRUGINOUS, an epithet given to such things as resemble or partake of the nature of the rust of copper.

ÆRUGO, in natural history, properly signifies the rust of copper, whether natural or artificial. The former is found about copper mines, and the latter made by corroding copper plates with acids †.

† See Materia Medica, 10 74.

ÆRUSCATORÆS, in antiquity, a kind of strolling beggars, not unlike gypsies, who drew money from the credulous by fortune-telling, &c. It was also a denomination given to griping exactors, or collectors of the revenue. The Galli, or priests of Cybele, were called *æruscatores magna matris*, and *æruscæugus*, on account of their begging or collecting alms in the streets; to which end they had little bells whereby to draw peoples attention to them, much like some orders of mendicants abroad.

ÆERY, or **AIRY**, among sportsmen. See **AIRY**.

ÆS, properly signifies copper, or money coined of that metal. See **COPPER**.

Æs Flavum, yellow copper, among the Romans, an appellation given to the coarser kinds of brass.

Æs Caldarium, a term used by the German mineralists, for a substance which sometimes occurs to those who work upon cobalt, and is used for the making the fine blue colour called *smalt*.

Æs Usum, a chemical preparation, made of thin leaves of copper, sulphur, and nitre, placed *stratum super stratum* in a crucible, and set in a charcoal fire, till all the sulphur is consumed; after which, the copper is taken out of the crucible, and reduced to powder. Some quench the leaves of copper in vinegar, and repeat the calcination.—Its principal use is in colouring glass, to which it gives a beautiful tincture. The surgeons use it as a detergent, and some have given it internally; but it is certainly a very dangerous medicine, and should be avoided.

ÆSCHINES, a Socratic philosopher, the son of Charinus a sausage-maker. He was continually with Socrates; which occasioned this philosopher to say, that the sausage-maker's son was the only person who knew how to pay a due regard to him. It is said that poverty obliged him to go Sicily, to Dionysius the Tyrant; and that he met with great contempt from Plato, but was extremely well received by Aristippus; to whom he shewed some of his dialogues, and received from him

a handsome reward. He would not venture to profess philosophy at Athens, Plato and Aristippus being in such high esteem; but he set up a school to maintain himself. He afterwards wrote orations for the Forum. Phrynicus, in Photius, ranks him amongst the best orators, and mentions his orations as the standard of the pure Attic style. Hermogenes has also spoken very highly of him.—He also wrote several dialogues, of which there are only three extant: 1. Concerning Virtue, whether it can be taught. 2. Eryxias, or Erasistratus; concerning riches, whether they are good. 3. Axiochus; concerning death, whether it is to be feared. Mr Le Clerc has given a Latin translation of them, with notes, and several dissertations, intitled *Sylve Philologicæ*.

ÆSCHYLUS, the tragic poet, was born at Athens. Authors differ in regard to the time of his birth, some placing it in the 65th, others in the 70th Olympiad; but according to Stanley, who relies on the Arundelian marbles, he was born in the 63^d Olympiad. He was the son of Euphoriion, and brother to Cynegirus and Aminias, who distinguished themselves in the battle of Marathon, and the sea-fight of Salamis, at which engagements Æschylus was likewise present. In this last action, according to Diodorus Siculus, Aminias, the younger of the three brothers, commanded a squadron of ships, and behaved with so much conduct and bravery, that he sunk the admiral of the Persian fleet, and signalized himself above all the Athenians. To this brother our poet was, upon a particular occasion, obliged for saving his life: Ælian relates, that Æschylus being charged by the Athenians with certain blasphemous expressions in some of his pieces, was accused of impiety, and condemned to be stoned to death: they were just going to put the sentence in execution, when Aminias, with a happy presence of mind, throwing aside his cloak, shewed his arm without a hand, which he had lost at the battle of Salamis, in defence of his country. This sight made such an impression on the judges, that, touched with the remembrance of his valour, and with the friendship he shewed for his brother, they pardoned Æschylus. Our poet, however, resented the indignity of this prosecution, and resolved to leave a place where his life had been in danger. He became more determined in this resolution when he found his pieces less pleasing to the Athenians than those of Sophocles, tho' a much younger writer. Some affirm, that Æschylus never sat down to compose but when he had drank liberally. He wrote a great number of tragedies, of which there are but seven remaining: and notwithstanding the sharp censures of some critics, he must be allowed to have been the father of the tragic art. In the time of Theſpis, there was no public theatre to act upon; the strollers driving about from place to place in a cart. Æschylus furnished his actors with masks, and dressed them suitably to their characters. He likewise introduced the bulkin, to make them appear more like heroes.—The ancients give Æschylus also the praise of having been the first who removed murders and shocking sights from the eyes of the spectators. He is said likewise to have lessened the number of the chorus. M. Le Fevre has observed, that Æschylus never represented women in love, in his tragedies; which, he says, was not suited to his genius; but, in representing a woman transported with fury, he was incomparable. Longinus says, that Æschylus has a noble boldness of expression; and that

Æthylus,

Æsculapius.

his imagination is lofty and heroic. It must be owned, however, that he affected pompous words; and that his sense is too often obscured by figures: this gave Salmastius occasion to say, that he was more difficult to be understood than the scripture itself. But notwithstanding these imperfections, this poet was held in great veneration by the Athenians, who made a public decree that his tragedies should be played after his death. He was killed in the 69th year of his age, by an eagle letting fall a tortoise upon his head as he was walking in the fields. He had the honour of a pompous funeral from the Sicilians, who buried him near the river Gela; and the tragedians of the country performed plays and theatrical exercises at his tomb.—The best edition of his plays is that of London, 1663, fol. with a Latin translation and a learned commentary by Tho. Stanley.

ÆSCHYNOMENE, **BASTARD SENSITIVE-PLANT**; a genus of the decandria order, belonging to the diadelphica class of plants. Of this genus they are reckoned fix

Species. 1. The aspera (as well as the rest of this genus) is a native of warm countries. It rises to the height of four or five feet, having a single herbaceous stalk, which is rough in some parts. The leaves come out on every side towards the top, forming a sort of head; the flowers come out between the leaves, two or three together upon long footstalks; they are yellow, and shaped like those of pease: after the flower is past, the germen becomes a flat jointed pod, which, when ripe, parts at the joints, and in each division is lodged a single kidney-shaped seed. 2. The americana, seldom rises more than two feet in height. The flowers come out from the leaves on branching footstalks, five or six together; these are much less than the former, and of a paler yellow colour. The seed is lodged in pods like the other. 3. The arborea, grows to the height of six or seven feet, with a single stem; the flowers come out two or three together, of a copper colour, and as large as those of the aspera. 4. The felshan hath woody stems, and branches garnished with smooth leaves. The flowers are small, of a deep yellow colour, and come out in long spikes hanging downward. The seed is contained in a smooth pod, not jointed. 5. The pumila, rises to the height of about three feet; has flowers of a pale yellow colour, which come out sometimes single, at other times two or three upon each foot stalk. The seeds are contained in a long falcated pod having 13 or 14 divisions, each of which lodges a single seed. 6. The grandiflora, rises six or eight feet high, with a woody stem, sending out branches towards the top, garnished with obtuse leaves. The flowers are large, yellow, and succeeded by large pods containing kidney-shaped seeds.

Culture. These plants are propagated by seeds, which should be sown early in the spring, on a hot-bed; and when the plants have strength enough to be removed, they should each be put into a separate pot filled with light earth, and plunged into a hot-bed. As they increase in size, they must be removed into larger pots; but if these are too large, the plants will not thrive. They must be brought forward early in the year, otherwise the second kind will not perfect its seed.

ÆSCULANUS, or **ÆRES**, in mythology, a deity who presided over the coinage of copper-money.

ÆSCULAPIUS, in the heathen mythology, the god of physic, was the son of Apollo and the nymph Coronis. He was educated by the centaur Chiron,

who taught him physic; by which means Æsculapius cured the most desperate diseases. But Jupiter, enraged at his resorting to life Hippolitus who had been torn in pieces by his own horses, killed him with a thunder-bolt. According to Cicero, there were three deities of this name: the first, the son of Apollo, worshipped in Acadia, who invented the probe, and bandages for wounds; the second, the brother of Mercury, killed by lightning; and the third, the son of Arisippus and Arinoc, who first taught the art of tooth-drawing and purging. At Epidaurus, Æsculapius's statue was of gold and ivory, with a long beard, his head surrounded with rays, holding in one hand a knotty stick, and the other entwined with a serpent; he was seated on a throne of the same materials as his statue, and had a dog lying at his feet. The Romans crowned him with laurel, to represent his descent from Apollo; and the Phalians represented him as beardless. The cock, the raven, and the goat, were sacred to this deity. His chief temples were at Pergamus, Smyrna, Trica a city in Ionia, and the Isle of Cos; in all which, votive tablets were hung up, shewing the diseases cured by his assistance. But his most famous shrine was at Epidaurus; where, every five years, games were instituted to him, nine days after the Isthmian games at Corinth.

ÆSCULAPIUS's Serpent, or **COLUBER ÆSCULAPII**. See **COLUBER**.

ÆSCULUS, the **HORSE-CHESTNUT**; a genus of the monogynia order, belonging to the heptandria class of plants. Of this genus there is but one known species, *viz.* the hippocastanum, or common horse-chestnut. It was brought from the northern parts of Asia about the year 1550, and sent to Vienna about 1588. It had the name of castanea from the shape of its fruit; and the title of *equini* was added on account of its being a proper food, when ground, for horses. This tree makes a noble appearance all the month of May, the extremities of the branches being terminated by fine spikes of flowers spotted with rose-colours, so that the whole tree seems covered with them. It is quick in its growth; so that in a few years it arrives at a size large enough to afford a good shade in summer, as also to produce plenty of flowers. They have however this great inconvenience, that their wood is of no use, being unfit even for burning; and their leaves beginning to fall in July, soon deprive the trees of their beauty. There is something very singular in the growth of these trees, which is, that the whole shoot is performed in less than three weeks after the buds are opened.—The nuts are reckoned good food for horses. In Turkey, they are ground, and mixed with the provender of these animals, especially those which are troubled with coughs or broken-winded. Deer are also very fond of the fruit; and at the time of their ripening keep much about the trees, but especially in strong winds, when the nuts are blown down, which they carefully watch, and greedily devour as they fall. A variety of this species grows naturally in North America, where it rises to the height of 20 feet, but does not spread its branches to any great extent. The flowers are wholly red, whence it is called the *scarlet horse-chestnut*: they are tubulated, and smaller than those of the other kind; but, for want of brims to expand, make an indifferent appearance.

Culture.

Æsculapius,
Æsculap.

Æsculus,
Ælop.

Ælop.

Culture. These trees are propagated by sowing the nuts, which ought to be done early in the spring; but the nuts should be preserved in sand during the winter, otherwise they are apt to grow mouldy and rot.—The tree will thrive in moist soils and situations, but best in a sandy loam; and, if it inclines to moisture, the leaves will continue in verdure much longer than in a very dry ground. When the nuts succeed, and have a proper soil, the plants will shoot near a foot the first summer; so that where they grow pretty thick together, it will be proper to transplant them the following autumn. They ought then to be planted in rows three feet asunder, and one foot distance from one another in the rows. In this nursery they may continue two years, and then be transplanted where they are designed to remain. In transplanting them, the roots ought to be preserved as entire as possible, and none of the branches broken on any account. When such an accident happens, the branch is to be cut over close by the stem, that the wound may heal over. Another particularity with respect to this tree, besides its quickness of growth, is, that as soon as the old leaves fall off, the new bud for the next year is formed, which continues swelling till autumn, at which time the folding leaves are covered with a tenacious juice, which serves as a pigment to defend the tender bud from the winter-frosts; but, upon the first return of warmth in the spring, this melts and runs off, leaving the bud at full liberty to expand. The scarlet horse-chestnut must be propagated from nuts procured from America, for they do not come to perfection in this country. They should be planted in pots early in the spring, and the pots plunged in a moderate hot-bed to forward their growth; towards the end of May, the pots should be put into the earth, in a south-east border, and duly watered in dry weather. They must be freed from the frost during the first winter or two, being impatient of cold whilst young; though when they have attained strength, it seldom hurts them: the following spring they should be carefully separated, and planted a foot distance from each other in a sheltered situation.

ÆSOP, the Phrygian, lived in the time of Solon, about the 50th Olympiad, under the reign of Cræsus the last king of Lydia. As to genius and abilities, he was greatly indebted to nature; but in other respects not so fortunate, being born a slave and extremely deformed. St. Jerom, speaking of him, says he was unfortunate in his birth, condition in life, and death; hinting thereby at his deformity, servile state, and tragical end. His great genius however enabled him to support his misfortunes; and in order to alleviate the hardships of servitude, he composed those entertaining and instructive fables which have acquired him so much reputation. He is generally supposed to have been the inventor of that kind of writing; but this is contested by several, particularly Quintilian, who seems to think that Hesiod was the first author of fables. Ælop, however, certainly improved this art to a very great degree; and hence it is that he has been accounted the author of this sort of productions:

Æsopus auctor quam materiam reperit,
Hanc ego polliivi verbisq; fensariis.

Phæd. Prol. ad lib. i.

If any thoughts in these iambs shine
Th' invention's Æsop's, and the verse is mine."

The first master whom Ælop served, was one Cara-

sius Demarchus, an inhabitant of Athens; and there in all probability he acquired his purity in the Greek tongue. After him he had several masters; and at length came under a philosopher named Idmon or Iadmon, who enfranchised him. After he had recovered his liberty, he soon acquired a great reputation amongst the Greeks; so that, according to Meziriac, the report of his wisdom having reached Cræsus, he sent to inquire after him, and engaged him in his service. He travelled through Greece, according to the same author; whether for his own pleasure, or upon the affairs of Cræsus, is uncertain; and passing by Athens soon after Pisistratus had usurped the sovereign power, and finding that the Athenians bore the yoke very impatiently, he told them the fable of the frogs who petitioned Jupiter for a king. The images made use of by Ælop are certainly very happy inventions to instruct mankind; they possess all that is necessary to perfect a precept, having a mixture of the useful with the agreeable. "Ælop the fabulist (says Aulus Gellius) was deservedly esteemed wise, since he did not, after the manner of the philosophers, rigidly and imperiously dictate such things as were proper to be advised and persuaded; but, framing entertaining and agreeable apologies, he thereby charms and captivates the human mind."—Ælop was put to death at Delphi. Plutarch tells us, that he came there with a great quantity of gold and silver, being ordered by Cræsus to offer a sacrifice to Apollo, and to give a considerable sum to each inhabitant: but a quarrel arising betwixt him and the Delphians, he sent back the money to Cræsus; for he thought those for whom the prince designed it, had rendered themselves unworthy of it. The inhabitants of Delphi contrived an accusation of sacrilege against him; and pretending they had convicted him, threw him headlong from a rock. For this cruelty and injustice, we are told, they were visited with famine and pestilence; and consulting the oracle, they received for answer, that the god designed this as a punishment for their treatment of Ælop: they endeavoured to make an atonement, by raising a pyramid to his honour.

ÆSOP (Clodius), a celebrated actor, who flourished about the 670th year of Rome. He and Roscius were cotemporaries, and the best performers who ever appeared upon the Roman stage, the former excelling in tragedy, the latter in comedy. Cicero put himself under their direction to perfect his action. Ælop lived in a most expensive manner, and at one entertainment is said to have had a dish which cost above eight hundred pounds; this dish, we are told, was filled with singing and speaking birds, some of which cost near 50*l*. The delight which Ælop took in this sort of birds proceeded, as Mr Bayle observes, from the expense. He did not make a dish of them because they could speak, this motive being only by accident, but because of their extraordinary price. If there had been any birds that could not speak, and yet more scarce and dear than these, he would have procured such for his table. Ælop's son was no less luxurious than his father, for he dissolved pearls for his guests to swallow. Some speak of this as a common practice of his; but others mention his falling into this excess only on a particular day, when he was treating his friends. Horace * speaks only of one pearl of great value, which he dissolved in vinegar, and drank. Ælop, notwithstanding his expenses,

* Sat. ii.
lib. ii. 239.

* *Ætatio**Ætius.*

ces, is said to have died worth above 160,000*l*. When he was upon the stage, he entered into his part to such a degree, as sometimes to be seized with a perfect ecstacy: Plutarch mentions it as reported of him, that whilst he was representing Atreus deliberating how he should revenge himself on Thyestes, he was so transported beyond himself in the heat of action, that with his truncheon he smote one of the servants crossing the stage, and laid him dead on the spot.

ÆSTIMATIO CAPITIS, a term met with in old law-books for a fine anciently ordained to be paid for offences committed against persons of quality, according to their several degrees.

ÆSTIVAL, in a general sense, denotes something connected with, or belonging to, summer. Hence æstival sign, æstival solstice, &c.

ÆSTUARIA, in geography, denotes an arm of the sea, which runs a good way within land. Such is the Bristol channel, and many of the friths of Scotland.

ÆSTUARIES, in ancient baths, were secret passages from the hypocaustum into the chambers*.

ÆSTUARY, among physicians, a vapour-bath, or any other instrument for conveying heat to the body.

ÆSYMNIIUM, in antiquity, a monument erected to the memory of the heroes, by Æsymnus the Megarean. He consulting the oracle in what manner the Megareans might be most happily governed, was answered, *If they held consultation with the more numerous: whom he taking for the dead, built the said monument, and a senate-house that took within its compass the monument; imagining, that thus the dead would assist at their consultations.* (Pausanias.)

ÆTH, or **ATH**, a strong little town in the Austrian Netherlands and province of Hainault, situated on the river Dender, about twenty miles S. W. of Brussels.

ÆTHER, in natural philosophy. See **ETHER**.

ÆTHER, in chemistry. See **CHEMISTRY**, n^o 167, 218, 261, 290, 305.

ÆTHERIAL. See **ETHERIAL**.

ÆTHIOPIA. See **ETHIOPIA**.

ÆTHIOPS, *Mineral and Antimonial*. See **PHARMACY**, n^o 752, 804.

ÆTHUSA, in botany, a genus of the pentandria digynia class. The volucrum is dimidiated, triphyllous, and pendulous. There is but one species, *viz.* the æthusa synapium, fools-parley, or lesser hemlock, (a native of Britain,) which grows in corn-fields and gardens. This plant, from its resemblance to common parley, hath sometimes been mistaken for it; and when eaten, it occasions sickness. If the curled-leaved parley only was cultivated in our gardens, no such mistakes would happen in future. Cows, horses, sheep, goats, and swine, eat it. It is noxious to geese.

ÆTIANUS, in church-history, a branch of Arians who maintained, that the Son and Holy Ghost are in all things dissimilar to the Father. See **ÆTIUS**.

ÆTIOLOGY, is that part of Pathology which is employed in exploring the causes of diseases*.

ÆTIUS, one of the most zealous defenders of Arianism, was born in Syria, and flourished about the year 336. After being servant to a grammarian, of whom he learned grammar and logic, he was ordained deacon, and at length bishop, by Eudoxus patriarch of Constantinople. St Epiphanius has preserved 47 of his propositions against the Trinity. His followers

followers were called **ÆTIANUS**.

ÆTIUS, a famous physician, born at Amida in Mesopotamia, and the author of a work intitled *Tetrabiblos*, which is a collection from the writings of those physicians who went before him. He lived, according to Dr Freind, at the end of the 5th or the beginning of the 6th century.

ÆTIUS, governor of Gallia Narbonensis in the reign of Valentinian III. forced the Franks who were passing into Gaul to repass the Rhine. He defeated the Goths; and routed Attila king of the Huns, who invaded Gaul with an army of 700,000 men. But the emperor, jealous of the merit of this great man, killed him in 454 with his own hand, under the pretence that he had permitted the invasion of the Huns, after Attila's defeat.

ÆTNA, (in the Itineraries *Æthna*, supposed from *aitis*, to burn; according to Bochart, from *Athuna*, a furnace, or *Ætuna*, darkness), now *Monte Gibello*; a volcano or burning mountain of Sicily, situated in lat. 38°. N. long. 15°. E.

This mountain, famous from the remotest antiquity, both for its bulk and terrible eruptions, stands in the eastern part of the island, in a very extensive plain, called *Val Demoni*, from the notion of its being inhabited by devils, who torment the spirits of the damned in the bowels of this volcano.

Concerning the dimensions of mount Ætna, we can scarce extract any thing consistent, even from the accounts of the latest and most ingenious travellers. Pindar, who lived about 435 years before Christ, calls it the *Pillar of heaven*, on account of its great height. All modern writers likewise agree, that this mountain is very high, and very large; but differ excessively both as to its height and magnitude: some making it no less than twelve miles high, others eight, others six, some four, while Mr Brydone, and Sir William Hamilton, who lately ascended to its highest fummit, reduce its height to little more than two miles; nay, by some, it is reduced to 10,036 feet, somewhat less than two miles. No less remarkable are the differences concerning its circumference: some making it only 60 miles round, others 100; and Signior Recupero, from whom Mr Brydone had his information in this respect, affirms it to be no less than 183 miles in circuit.

We are sorry to detract from the merit of Mr Brydone, or to involve in obscurity what he hath been at so much pains to elucidate; but every person who compares the account of mount Ætna's circumference, given by Signior Recupero, and to which Mr Brydone seems to have assented, with its apparent circumference on the map prefixed to that gentleman's tour through Sicily and Malta, must at once be struck with the prodigious disparity. Indeed, it is plain, that, in the map, the geographer hath not left room for any such mountain; nor can we help thinking, that, by comparing the distances of some of the Sicilian towns from one another, Signior Recupero's dimensions will be found enormously exaggerated.—Certain it is, that there the geographer hath placed Catania, which stands at the foot of mount Ætna, on one side, no more than 28 miles from the most distant point of the river Alcantara, which forms the boundary on the opposite side; so that a circle, whose radius is 14 or 15 miles, must encompass as much space as we can possibly think is occupied by

*Ætius.**Ætna.*

Inconsistent accounts concerning the magnitude of Ætna.

* See *Medicine*, Part II. chap. ii. or n^o 72, et seq.

Ætna.

by the basis of mount Ætna. Thus we will reduce the circumference of this famous mountain to between 80 and 90 miles; and even when we do so, it must still be acknowledged to be very great.

But if we are embarrassed with the circumference of Ætna, we are much more so with the accounts relating to its height; and one circumstance, particularly, creates almost insurmountable difficulties. It is agreed upon by all travellers, and among the rest by Sir William Hamilton, that from Catania, where the ascent first begins, to the summit, is not less than 30 miles. The descent on the other side we have no account of; but, whatever supposition we make, the height of the mountain must be prodigious. If we suppose it likewise to be 30 miles, and that mount Ætna can be represented by an equilateral triangle, each of whose sides is 30 miles, we will have an amazing elevation indeed, no less than 26 miles perpendicular!—Such a height being beyond all credibility, we must contract the sides of our triangle, in proportion to its basis. We shall begin with allowing 10 miles for the difference between a straight line from Catania to the summit, and the length of the road, occasioned by the inequalities of the mountain; and supposing the descent on the other side to be somewhat shorter, we may call it 15 miles. Mount Ætna will now be represented by a scalene triangle, whose base is 30 miles, its longest side 20, and its shortest 15; from which proportions we will still find its height to be betwixt eight and nine miles.—This is still incredible; and when all the various relations concerning the height of Ætna are compared, we hope it will not be thought presumptuous in us to give it as our opinion, that the true dimensions of this mountain are as yet unknown.

Dimensions
uncertain.General ap-
pearance,
&c.

Concerning the products and general appearance of this volcano, authors are much better agreed.—The journey from Catania to its summit has been lately described by three travellers, M. D'Orville, Mr Brydone, and Sir William Hamilton. All these agree, that this single mountain affords an epitome of the different climates throughout the whole world: towards the foot, it is very hot; farther up, more temperate; and grows gradually more and more cold the higher we ascend. At the very top, it is perpetually covered with snow; from thence the whole island is supplied with that article, so necessary in a hot climate, and without which the natives say Sicily could not be inhabited. So great is the demand for this commodity, that the bishop's revenues, which are considerable, arise from the sale of mount Ætna's snow; and he is said to draw 1000*l.* a year from one small portion lying on the north side of the mountain. Great quantities of snow and ice are likewise exported to Malta and Italy, making a considerable branch of commerce. On the north side of this snowy region, Mr Brydone was assured, that there are several small lakes which never thaw; and that the snow mixed with the ashes and salts of the mountain are accumulated to a vast depth. The quantity of salts contained in this mountain, he, with great probability, conjectures to be one reason of the preservation of its snows; for salt increases the coldness of snow to a surprising degree*.

* See Cold,
and Congela-
tion.

In the middle of the snowy region stands the great crater, or mouth of Ætna; from which, though contrary to the usual method of travellers, we shall begin our particular account of this mountain. Sir William

Hamilton describes the crater as a little mountain, about a quarter of a mile perpendicular, and very steep, situated in the middle of a gently inclining plain, of about nine miles in circumference. It is entirely formed of stones and ashes; and, as Mr Hamilton was informed by several people of Catania, had been thrown up about 25 or 30 years before the time (1769) he visited mount Ætna. Before this mountain was thrown up, there was only a prodigious large chasm, or gulph, in the middle of the above-mentioned plain; and it has been remarked, that about once in 100 years the top of Ætna falls in; which undoubtedly must be the case at certain periods, or the mountain behaved continually to increase in height. As this little mountain, though emitting smoke from every pore, appeared solid and firm, Mr Hamilton and his companions went up to the very top. In the middle is a hollow, about two miles and a half in circumference, according to Mr Hamilton; three miles and a half, according to Mr Brydone; and three or four, according to Mr D'Orville. The inside is crufted over with salts and sulphur of different colours. It goes shelving down, from the top, like an inverted cone; the depth, in Mr Hamilton's opinion, nearly corresponding to the height of the little mountain. From many places of this space issue volumes of sulphureous smoke, which being much heavier than the circumambient air, instead of ascending in it, roll down the side of the mountain, till, coming to a more dense atmosphere, it shoots off horizontally, and forms a large tract in the air, according to the direction of the wind; which, happily for our travellers, carried it exactly to the side opposite to which they were placed. In the middle of this funnel is the tremendous and unfathomable gulph, so much celebrated in all ages, both as the terror of this life, and the place of punishment in the next. From this gulph continually issue terrible and confused noises, which in eruptions are increased to such a degree as to be heard at a prodigious distance. Its diameter is probably very different at different times: for Mr Hamilton observed, by the wind clearing away the smoke from time to time, that the inverted hollow cone was contracted almost to a point; while Mr D'Orville and Mr Brydone found the opening very large. Both Mr Brydone and Mr Hamilton found the crater too hot to descend into it; but Mr D'Orville was bolder: and accordingly he and his fellow-traveller, fastened to ropes which two or three men held at a distance for fear of accidents, descended as near as possible to the brink of the gulph; but the small flames and smoke which issued from it on every side, and a greenish sulphur and pumice-stones, quite black, which covered the margin, would not permit them to come so near as to have a full view. They only saw distinctly in the middle, a mass of matter which rose, in the shape of a cone, to the height of above 60 feet, and which towards the base, as far as their sight could reach, might be 600 or 800. While they were observing this substance, some motion was perceived on the north side, opposite to that whereon they stood; and immediately the mountain began to send forth smoke and ashes. This eruption was preceded by a sensible increase of its internal roarings; which, however, did not continue; but after a moment's dilatation, as if to give it vent, the volcano resumed its former tranquillity; but

Ætna.

Crater de-
scribed.

Ætna.

as it was by no means proper to make a long stay in such a place, our travellers immediately returned to their attendants.

On the summit of mount Ætna, Mr Hamilton observes that he was sensible of a difficulty in respiration from the too great subtilty of the air, independent of what arose from the sulphureous smoke of the mountain. Mr Brydome takes no notice of this; which probably arose from the air being in a more rarefied state at the time of Mr Hamilton's observation, than of Mr Brydome's; the barometer, as observed by the former, standing at 18 inches and 10 lines, by the latter at 19 inches 6½ lines.

In these high regions there is generally a very violent wind, which, as all our travellers found it constantly blowing from the south, may possibly be commonly directed from that point. Here Mr Brydome's thermometer fell to 27°.

Splendor of
the stars seen
from the top
of Ætna.

The top of Ætna being above the common region of vapours, the heavens appear with exceeding great splendor.—Mr Brydome and his company observed, as they ascended in the night, that the number of stars seemed to be infinitely increased, and the light of each of them appeared brighter than usual; the whiteness of the milky way was like a pure flame which shot across the heavens; and, with the naked eye, they could observe clusters of stars that were invisible from below. Had Jupiter been visible, he is of opinion that some of his satellites might have been discovered with the naked eye, or at least with a very small pocket-glass. He likewise took notice of several of those meteors called *falling stars*; which appeared as much elevated as when viewed from the plain: a proof, according to Mr Brydome, that “these bodies move in regions much beyond the bounds that some philosophers have assigned to our atmosphere.”

Extensive
prospect.

To have a full and clear prospect from the summit of mount Ætna, it is necessary to be there before sunrise; as the vapours raised by the sun, in the day-time, will obscure every object: accordingly, our travellers took care to arrive there early enough; and all agree, that the beauty of the prospect from thence cannot be expressed.—Here Mr Brydome and Mr Hamilton had a view of Calabria in Italy, with the sea beyond it; the Lipari islands, and Stromboli a volcano at about 70 miles distance, appeared just under their feet; the whole island of Sicily, with its rivers, towns, harbours, &c. appeared distinct, as if seen on a map. Massa, a Sicilian author, affirms, that the African coast as well that of Naples, with many of its islands, have been discovered from the top of Ætna. The visible horizon here, is not less than 8 or 900 miles in diameter. The pyramidal shadow of the mountain reaches across the whole island, and far into the sea on the other side, forming a visible tract in the air, which, as the sun rises above the horizon, is shortened, and at last confined to the neighbourhood of Ætna. The most beautiful part of the scene, however, in Mr Brydome's opinion, is the mountain itself, the island of Sicily, and the numerous islands lying round it. These last seem to be close to the skirts of Ætna; the distances appearing reduced to nothing.

Division in-
to three
zones.

This mountain is divided into three zones, which might properly enough be distinguished by the names of *torrid*, *temperate*, and *frigid*; they are, however,

known by the names of the *Piedmontese*, or *Regione culta*, the cultivated, or fertile region; the *Sylvasia*, woody, or temperate zone; and the *Regione deserta*, the frigid, or desert zone, or region. All these are plainly distinguished from the summit. The *Regione deserta* is marked out by a circle of snow and ice, which extends on all sides to the distance of about eight miles, beginning at the foot of the crater. Greatest part of this region is smooth and even. This is immediately succeeded by the *Sylvasia*, or woody region; which forms a circle of the most beautiful green, surrounding the mountain on all sides. This region is variegated with a vast number of mountains of a conical form, thrown up by Ætna in those eruptions which burst out from its sides. Mr Hamilton counted 44 on the Catania side, each having its crater, many with large trees flourishing both within and without the crater. All these, except a few of late date, have acquired a wonderful degree of fertility. The circumference of this zone, or great circle, according to Recupero, is not less than 70 or 80 miles. It is everywhere succeeded by the *Regione culta*; which is much broader than the rest, and extends on all sides to the foot of the mountain. Here terrible devastations are sometimes committed by the eruptions; and the whole region is likewise full of conical mountains thrown up by them. The circumference of this region, is, by Recupero, reckoned 183 miles; but we have already given our reasons for rejecting these dimensions.—This region is bounded by the sea to the south and south-east; and on all other sides, by the rivers Semetus and Alcantara, which form the boundaries of mount Ætna.

About a mile below the foot of the great crater, are found the ruins of an ancient structure, called *Il Torre del Filosofo*, by some supposed to have been built by the philosopher Empedocles, who took up his habitation here, the better to study the nature of mount Ætna. By others they are supposed to be ruins of a temple of Vulcan. They are of brick, and seem to have been ornamented with marble. Somewhere in this region also, Mr D'Orville found a great oblong block of polished marble, eight or ten feet high, and three or four thick; though how it came there, was quite unaccountable to him. From Mr D'Orville's and Mr Brydome's accounts, we must reckon this part of the mountain pretty steep; but Mr Hamilton says, that the ascent was so gradual, as not to be in the least fatiguing; and had it not been for the snows, they might have rode on their mules to the very foot of the crater.

The woody region descends eight or nine miles below the *Regione deserta*, but differs greatly in the temperature of its climate. Mr Hamilton observed a gradual decrease of the vegetation as he advanced; the under part being covered with large timber trees, which grew gradually less as he approached the third region, at last they degenerated into the small plants of the northern climates. He also observed quantities of juniper and tansey; and was informed by his guide, that later in the season (he visited Ætna in June 1769) there are a great many curious plants, and in some places rhubarb and saffron in great plenty. In Carrera's history of Catania, there is a list of all the plants and herbs of Ætna, in alphabetical order.

This region is extolled by Mr Brydome as one of the most delightful spots on earth. He lodged for a night in a large cave near the middle, formed by one of the
moist

Ætna.

Regione des-
serta.

Il Torre del
Filosofo.

Regione
Sylvasia.

Ætna.

Ætna.

most ancient lavas. It is called *La Spelonca del Capriolo*, or the goats cavern; because it is frequented by those animals, which take refuge there in bad weather. Here his rest was disturbed by a mountain thrown up in the eruption 1766. It discharged great quantities of smoke, and made several explosions like heavy cannon fired at a distance; but they could observe no appearance of fire.

This gentleman likewise visited the eastern side of the *Regione sflosa*, intending to have ascended that way to the summit, and defended again on the south side to Catania; but found it impracticable; though what the insurmountable difficulties were, he does not mention. On this side, part of the woody region was destroyed, in 1755, by an immense torrent of boiling water, which issued from the great crater. Its traces were still very visible, about a mile and an half broad, and in some places more. The soil was then only beginning to recover its vegetative power, which it seems this torrent had destroyed for 14 years.—Near this place are some beautiful woods of cork, and evergreen oak, growing absolutely out of the lava, the soil having hardly filled the crevices; and not far off, our traveller observed seven little mountains that seemed to have been formed by a late eruption. Each of these had a regular cup, or crater, on the top; and, in some, the middle gulph, or *Voragine*, as the Sicilians call it, was still open. Into these gulphs Mr Brydone tumbled down stones, and heard the noise for a long time after. All the fields round, to a considerable distance, were covered with large burnt stones discharged from these little volcanoes.

Eruption of boiling water.

Overgrown chestnut-trees.

The woody region, especially the east side, called *Carpinetto*, abounds with very large chestnut-trees; the most remarkable of which has been called, from its size, *Castagno de Cento Cavalli*, or chestnut-tree of an hundred horse. Mr Brydone was greatly disappointed at the sight of this tree, as it is only a bush of five large ones growing together: but his guides assured him, that all these five were once united into one stem; and Signior Recupero told him, that he himself had been at the expence of carrying up peasants with tools to dig round this bush of trees, and found all the stems united below ground in one root. The circumference, as measured by Messrs Brydone and Glover who accompanied him, amounted to 204 feet. Another of these, about a mile and a half higher on the mountain, is called *Castagno del Galea*: it rises from one solid item to a considerable height; after which it branches out, and is a much finer object than the other: this was measured two feet above the ground, and found to be 76 feet in circumference. A third, called *Castagno del Nave*, is pretty nearly of the same size; and Massa, one of the most esteemed Sicilian authors, affirms that he has seen solid oaks there upwards of 40 feet round. All these grow on a thick rich soil, which seems originally to have been formed of ashes thrown out by the mountain. Here the barometer stood at 26 inches 5 lines and an half, indicating an elevation of near 4000 feet.

Regione Caltà.

The Piedmontese district is covered with towns, villages, monasteries, &c. and is well peopled, notwithstanding the danger of such a situation: but the fertility of the soil tempts people to inhabit that country; and their superstitious confidence in their fairs, with the propensity mankind have to despise danger which they do not see, render them as secure there as in any o-

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ther place. Here, Sir W^m Hamilton observes, they keep their vines low, contrary to the custom of those who inhabit mount Vefuvius; and they produce a stronger wine, but not in such abundance: here also many terrible eruptions have burst forth; particularly one in 1669. At the foot of the mountain raised by that eruption, is a hole, through which Sir W^m Hamilton descended, by means of a rope, into several subterranean caverns, branching out, and extending much farther than he chose to venture, the cold there being excessive, and a violent wind extinguishing some of the torches. Many other caverns are known in this and the other regions of Ætna; particularly one near this place called *La Spelonca della Palomba*, (from the wild pigeons building their nests there.) Here Mr Brydone was told that some people had lost their senses, from having advanced too far, imagining they saw devils and damned spirits.—Some of these caverns are made use of as magazines for snow; which they are well adapted for, on account of their extreme cold. These are with great probability supposed by Sir W^m Hamilton to be the hollows made by the issuing of the lava in eruptions.

Subterranean caverns.

In this region the river *Acis*, so much celebrated by River Acis. the poets, in the fable of *Acis* and *Galatea*, takes its rise. It bursts out of the earth at once in a large stream, runs with great rapidity, and about a mile from its source throws itself into the sea. Its water is remarkably clear; and so extremely cold, that it is reckoned dangerous to drink it: it is said, however, to have a poisonous quality, from being impregnated with vitriol; in consequence of which, cattle have been killed by it. It never freezes, but is said often to contract a greater degree of cold than ice.

Having thus given an account of this mountain in its quiet and peaceable state, we must now describe the appearance it puts on during the time of an eruption, when it spreads destruction for many miles round, and is capable of striking the boldest with terror.—Here we are surprised to find ourselves at a loss; for though there are many particular accounts of the eruptions of Vefuvius, we cannot, after the most diligent search, find that any writer hath accurately described the phenomena attending an eruption of Ætna.—Borelli, indeed, an Italian writer, published a natural history of this mountain for the year 1669, when a very terrible eruption happened; but as this treatise is not now to be found, in this part of the world at least, we must supply the deficiency in the best manner we can, by such hints as can be obtained from the writing of Sir W^m Hamilton and Mr Brydone, together with a very imperfect account given by some English merchants who happened to be in Catania at that time, and recorded in the Philosophical Transactions N^o 51.

Appearances during an eruption.

Sir W^m Hamilton, who has examined both Vefuvius and Ætna in a very accurate manner, never had an opportunity of seeing an eruption of the latter; but as he is of opinion that the two volcanoes agree perfectly in all respects, only that the latter is on a much larger scale than the former, we hope it will not be unacceptable to our readers to give an account of some of the general appearances of Vefuvius when in a state of eruption, the better to help their ideas concerning Ætna.

It has been already observed, that a smoke constantly issues from the top of Ætna, and that its inter-

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Ætna.

nal noises never cease. The cafe is the fame with Vefuvius: and Sir W^m Hamilton obferved, that in bad weather the fmoke was more confiderable, as well as the noises much louder, than when it was fair; fo that in bad weather he had frequently heard the inward explofions of the mountain at Naples, fix miles diftant from Vefuvius. He alfo obferved the fmoke that iffued from the mountain in bad weather to be very white, moift, and not near fo offenfive as the fulphureous fteams from various cracks in the fide of the mountain.

Signs of an approaching eruption

The firft fymptom of an approaching eruption is an increafe of the fmoke in fair weather: after fome time, a puff of black fmoke is frequently feen to fhoot up in the midft of the white, to a confiderable height. Thefe puffs are attended with confiderable explofions: for while Vefuvius was in this ftate, Sir W^m Hamilton went up to its top, which was covered with fnow; and perceiving a little hillock of fulphur, about fix feet high, which had been lately thrown up, and burnt with a blue flame at the top, he was examining this phenomenon, when fuddenly a violent report was heard, a column of black fmoke fhoot up with violence, and was followed by a reddifh flame. Immediately a fhower of ftones fell; upon which he thought proper to retire. Phenomena of this kind, in all probability, precede the eruptions of Ætna, in a much greater degree.—The fmoke at length appears wholly black in the day-time, and in the night has the appearance of flame; fhowers of afhes are fent forth, earthquakes are produced, the mountain difcharges volleys of red-hot ftones to a great height in the air. The force by which thefe ftones are projected, as well as their magnitude, feems to be in proportion to the bulk of the mountain. Signior Recupero affured Mr Brydone, that he had feen immenfe large ones thrown perpendicularly upwards to the height of 7000 feet, as he calculated from the time they took to arrive at the earth after beginning to defend from their greateft elevation. The largeft ftone, or rather rock, that was ever known to be emitted by Vefuvius, was 12 feet long, and 45 in circumference. This was thrown a quarter of a mile; but much larger ones have been thrown out by mount Ætna, almoft in the proportion in which the latter exceeds Vefuvius in bulk. Along with thefe terrible fymptoms, the fmoke that iffues from the crater is fometimes in a highly electrified ftate. In this cafe, the fmall afhes which are continually emitted from the crater, are attracted by the fmoke, and rife with it to a great height, forming a vaft black, and to appearance denfe, column; from this column continual fafhies of forked or zig-zag lightning iffue, fometimes attended with thunder; and fometimes not, but equally powerful with ordinary lightning. This phenomenon was obferved by Sir W^m Hamilton in the fmoke of Vefuvius, and has alfo been taken notice of in that of Ætna; and where this electrified fmoke hath fpread over a tract of land, much mischief hath been done by the lightning proceeding from it.

Thunder & lightning from the fmoke.

When thefe dreadful appearances have continued fometimes four or five months, the lava begins to make its appearance. This is a ftream of melted mineral matters, which in Vefuvius commonly boils over the top; but very feldom does fo in Ætna; owing to the great weight of the lava, which, long before it can be raifed to the vaft height of mount Ætna, burfts out

through fome weak place in its fide. Upon the appearance of the lava, the violent eruptions of the mountain generally, though not always, ceafe; for if this burning matter gets not fufficient vent, the commotions increafe to a prodigious degree.—In the night-time the lava appears like a ftream of fire, accompanied with flame: but in the day-time it has no fuch appearance; its progrefs is marked by a white fmoke, which by the reflection of the red-hot matter in the night affumes the appearance of flame.

All the abovementioned fymptoms preceded the great eruption of Ætna in 1669. For feveral months before 1669. the lava broke forth, the old mouth, or great crater on the fummit, was obferved to fend forth great quantities of fmoke and flame; the top had fallen in, fo that the mountain was much lowered; the iflands alfo of Volcan and Stromboli, two vulcanoes to the weftward of Sicily, were obferved to rage more than ufual.—Eighteen days before the eruption, the fky was very thick and dark, with thunder, lightning, frequent concuffions of the earth, and dreadful fubterraneous bellowsings. On the 11th of March, fome time before the lava got vent, a rent was opened in the mountain twelve miles in length, into which, when ftones were thrown down, they could not be heard to ftrike the bottom. Burning rocks, 60 palms (15 of our feet) in length, were thrown to the diftance of a mile; others of a leffer fize were carried three miles off; the internal noises of the mountain were exceedingly dreadful, and the thunder and lightning from the fmoke fcarce lefs terrible than they. When the lava at laft got vent, it burft out of a vineyard, 20 miles below the great crater, and fprung up into the air to a confiderable height. Here it formed a mountain of ftones and afhes, not lefs, as Sir W^m Hamilton conjectures, than half a mile perpendicular in height, and three miles in circumference. For 54 days, neither fun nor ftars had appeared; but foon after the lava got vent, the mountain became very quiet. The terrible effects of this fiery ftream may be imagined from its amazing extent; being, as Sir W^m Hamilton obferves, no lefs than 14 miles long, and in many places fix in breadth. In its courfe, it deftroyed the habitations of near 30,000 perfons; and meeting with a lake four miles in compafs, it not only filled it up, though feveral fathom deep, but made a mountain in the place of it. Having reached Catania, it deftroyed part of its walls, and ran for a confiderable length into the fea, forming a safe and beautiful harbour; which, however, was foon filled up by a frefh torrent of the fame inflamed matter.

It is not eafy for thofe who have never been prefent at thofe terrible operations of nature, to reprent to their minds the horror which muft attend the breaking forth of a lava; for though the giving vent to this burning matter generally produces a ceffation of the violent efforts of the internal fire, yet at the very inflant of its explofion fcarce any thing can be conceived fo dreadful.—As we cannot find a particular account of what happened at the breaking forth of the lava in mount Ætna in 1669, we muft content ourfelves with giving the reader fome idea of it from Sir W^m Hamilton's account of the breaking forth of a lava in Vefuvius, no more than a quarter of a mile's diftance from the place where he flood. "I was making my obfervations," fays he, "on the lava, which had already, from the

Ætna.

Eruption in 1669.

Phenomena at the breaking forth of the lava.

Hamilton's Observations, p. 264

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Ætina.

"spot where it first broke out, reached the valley; when, on a sudden, about noon, I heard a violent noise within the mountain, and about a quarter of a mile off the place where I stood, the mountain split, and with much noise, from this new mouth, a fountain of liquid fire shot up many feet high, and then, like a torrent, rolled on directly towards us. The earth shook, at the same time that a volley of pumice-stones fell thick upon us; in an instant, clouds of black smoke and ashes caused almost a total darkness; the explosions from the top of the mountain were much louder than any thunder I ever heard, and the smell of sulphur was likewise very offensive. My guide, alarmed, took to his heels; and I must confess I was not at my ease. I followed close, and we ran near three miles without stopping; as the earth continued to shake under our feet, I was apprehensive of the opening of a fresh mouth, which might have cut off our retreat. I also feared that the violent explosions would detach some of the rocks off the mountain of Somma, under which we were obliged to pass; besides, the pumice-stones, falling upon us like hail, were of such a size as to cause a disagreeable sensation upon the part where they fell. After having taken breath, as the earth still trembled greatly, I thought it most prudent to leave the mountain and return to my villa; where I found my family in a great alarm at the continual and violent explosions of the vulcano, which shook our house to its very foundation, the doors and windows swinging upon their hinges.—The noise and smell of sulphur increasing, we removed from our villa to Naples: and I thought proper, as I passed by Portici, to inform the court of what I had seen; and humbly offered it as my opinion, that his Sicilian Majesty should leave the neighbourhood of the threatening mountain.—I observed, in my way to Naples, which was in less than two hours after I had left the mountain, that the lava had actually covered three miles of the very road through which we had retreated. It is astonishing that it should have run so fast; as I have since seen, that the river of lava in the Atio di Cavallo was 60 and 70 feet deep, and in some places near two miles broad. When his Sicilian Majesty quitted Portici, the noise was greatly increased; and the concussion of the air from the explosions was so violent, that, in the king's palace, doors and windows were forced open, and even one door there, which was locked, was nevertheless burst open. At Naples, the same night, many windows and doors flew open: (the windows at Naples open like-folding doors.) In my house, which is not on the side of the town next Vesuvius, I tried the experiment of unbolting my windows, when they flew wide open upon every explosion of the mountain. Besides these explosions, which were very frequent, there was a continued subterraneous and violent rumbling noise; which lasted this night about five hours."

No doubt the same terrible appearances are put on by Ætina at the time its lavas break forth; but in a much greater degree, in proportion to the superior size of the mountain.—The appearance, and indeed the effects, of the lava itself, are very dreadful. When it first issues, the lava appears very fluid, and runs with the ra-

pidity of a swift river: but even then it surprisingly resists the impression of solid bodies; for Sir W^m Hamilton could not pierce that of Vesuvius with a stick driven against it with all his force; nor did the largest stone he was able to throw upon it sink, but made a slight impression, and then floated along. This happened almost at the very mouth, when the lava appeared liquid as water, and when he saw it running with a rapidity equal to the river Severn at the passage near Bristol.—A description of the lava issuing from mount Ætina in 1669 was sent to the court of England by Lord Winchelsea, who at that time happened to be at Catania in his way home from an embassy at Constantinople. His account is not now to be procured; but Mr Hamilton found a copy in Sicily, and hath given an extract, part of which follows. "When it was night, I went upon two towers in divers places; and I could plainly see, at ten miles distance, as we judged, the fire begin to run from the mountain in a direct line, the flame to ascend as high and as big as one of the greatest steeples in your Majesty's kingdoms, and to throw up great stones into the air; I could discern the river of fire to defend the mountain of a terrible fiery or red colour, and stones of a paler red to swim thereon, and to be some as big as an ordinary table. We could see this fire to move in several other places, and all the country covered with fire, ascending with great flames in many places, smoking like to a violent furnace of iron melted, making a noise with the great pieces that fell, especially those that fell into the sea. A cavalier of Malta, who lives there, and attended me, told me, that the river was as liquid, where it issues out of the mountain, as water, and came out like a torrent with great violence, and is five or six fathom deep, and as broad, and that no stones sink therein."

The account given in the Philosophical Transactions is to the same purpose. We are there told, that the lava is "nothing else than diverse kinds of metals and minerals, rendered liquid by the fierceness of the fire in the bowels of the earth, boiling up and gushing forth as the water doth at the head of some great river; and having run in a full body for a stone's-cast or more, began to crust or curdle, becoming, when cold, those hard porous stones which the people call *Sciarrì*." Those, though cold in comparison of what first issues from the mountain, yet retained so much heat as to resemble huge cakes of sea-coal strongly ignited, and came tumbling over one another, bearing down or burning whatever was in their way.—In this manner the lava proceeded slowly on till it came to the sea, when a most extraordinary conflict ensued betwixt the two adverse elements. The noise was vastly more dreadful than the loudest thunder, being heard thro' the whole country to an immense distance; the water seemed to retire and diminish before the lava, while clouds of vapour darkened the sun. The whole fish on the coast were destroyed, the colour of the sea itself was changed, and the transparency of its waters lost for many months.

While this lava was issuing in such prodigious quantity, the merchants, whose account is recorded in the Philosophical Transactions, attempted to go up to the mouth itself; but durst not come nearer than a furlong, lest they should have been overwhelmed by a vast pillar

Ætina.

Hamilton's Observations, p. 10.

Lava of 1669 described.

Ætna
||
Affection.

Diameter
of the hole
whence the
lava issued.

Antiquity
of the eruptions.

lar of ashes, which to their apprehension exceeded twice the bigness of St Paul's steeple in London, and went up into the air to a far greater height; at the mouth itself was a continual noise, like the beating of great waves of the sea against rocks, or like distant thunder, which sometimes was so violent as to be heard 60, or even 100 miles off, to which distance also part of the ashes were carried.—Some time after, having gone up, they found the mouth from whence this terrible deluge issued to be only a hole about 10 feet diameter. This is also confirmed by Mr Brydone; and is probably the same through which Sir W^m Hamilton descended into the subterranean caverns already mentioned.

Mount Ætna, as we have already remarked, has been a celebrated Vulcano from the remotest antiquity. Diodorus Siculus mentions eruptions of it as happening 500 years before the Trojan war, or 1693 years before the Christian æra. Many others are recorded by historians in different ages, but none are particularly described. The mountain seems sometimes to lie dormant for many years, or even centuries; when it breaks out again with great fury, and will sometimes burn for years together. Since 1669 there have been several eruptions, but none of them comparable to that one. The last happened in 1766. The lava sprung up into the air to a considerable height, twelve miles below the summit; but formed a stream only six miles in length, and one mile in breadth.

These are the most remarkable circumstances we have been able to collect, that might serve to give an adequate idea of this famous mountain.—Many things, however, concerning the extent, antiquity, &c. of the lavas, remain to be discussed, as well as the opinions of philosophers concerning the origin of the internal fire which produces so much mischief: but the consideration of these belongs to the general article VULCANO, to which the reader is referred.—The fate of *Catania* and *Hibla*, which have often been destroyed by eruptions, falls to be mentioned under these two words.

ÆTOLARCHA, in Grecian antiquity, the principal magistrate or governor of the Ætolians.

AFER (Domitius), born at Nîmes, a famous orator under Tiberius and the three succeeding emperors. Quintilian makes frequent mention of him, and commends his pleadings. But he disgraced his talents, by turning informer against some of the most distinguished personages in Rome. He died A. D. 59.

AFFECTION, in a general sense, implies an attribute inseparable from its subject. Thus magnitude, figure, weight, &c. are affections of all bodies; and love, fear, hatred, &c. are affections of the mind*.

* See Moral
Philosophy,
Part I. sec. i.
iv.

AFFECTION, signifying a settled bent of mind toward a particular being or thing, occupies a middle space between *disposition* on the one hand, and *passion* on the other †. It is distinguishable from *Disposition*, which being a branch of one's nature, originally, must exist before there can be an opportunity to exert it upon any particular object; whereas *Affection* can never be original, because, having a special relation to a particular object, it cannot exist till the object have once at least been presented. It is also distinguishable from *Passion*, which, depending on the real or ideal presence of its object, vanishes with its object: whereas *Affection* is a lasting connection; and, like other connections, subsists even when we do not think of the person. A familiar

Affection
Affection

example will illustrate this. There may be in one person's mind a disposition to gratitude, which, through want of an object, happens never to be exerted; and which therefore is never discovered even by the person himself. Another, who has the same disposition, meets with a kindly office that makes him grateful to his benefactor: An intimate connection is formed between them, termed *affection*; which, like other connections, has a permanent existence, though not always in view. The affection, for the most part, lies dormant, till an opportunity offer for exerting it: in that circumstance, it is converted into passion of gratitude; and the opportunity is eagerly seized of testifying gratitude in the warmest manner.

AFFECTION, among physicians, signifies the same as disease. Thus the hysterical *affection* is the same with the hysterical disease.

AFFECTIONS and *Passions*, (non-naturals.) See MEDICINE, n° 153.

AFFEERERS, or AFFEERORS, in law, persons appointed in court-leets, courts-baron, &c. to settle, upon oath, the fines to be imposed upon those who have been guilty of faults arbitrarily punishable.

AFFETUOSO, or *Con Affetto*, in the Italian music, intimates that the part to which it is added ought to be played in a tender moving way, and consequently rather slow than fast.

AFFIANCE, in law, denotes the mutual plighting of troth between a man and woman to marry each other.

AFFIDAVIT, signifies an oath in writing, sworn before some person who is authorized to take the same.

AFFINITY, among civilians, implies a relation contracted by marriage; in contradistinction to consanguinity, or relation by blood.—Affinity does not found any real kinship; it is no more than a kind of fiction, introduced on account of the close relation between husband and wife. It is even said to cease, when the cause of it ceases: hence a woman who is not capable of being a witness for her husband's brother during his lifetime, is allowed for a witness when a widow, by reason the affinity is dissolved. Yet with regard to the contracting marriage, affinity is not dissolved by death, though it be in every thing else.

AFFINITY, is also used to denote conformity or agreement: Thus we say, the affinity of languages, the affinity of words, the affinity of sounds, &c.

AFFINITY, in chemistry, implies that natural impulse or attraction which various bodies exert towards each other. See CHEMISTRY, n° 15, 27, 64.

AFFIRMATION, in logic, the asserting the truth of any proposition.

AFFIRMATION, in law, denotes an indulgence allowed to the people called Quakers; who, in cases where an oath is required from others, may make a solemn affirmation that what they say is true; and if they make a false affirmation, they are subject to the penalties of perjury. But this relates only to oaths taken to the government, and on civil occasions; for Quakers are not permitted to give their testimony in any criminal case, &c.

AFFIRMATION, is also used for the ratifying or confirming the sentence or decree of some inferior court: thus we say, the House of Lords affirmed the decree of the lord chancellor, or the decree of the lords of session.

AFFLATUS,

AFFLATUS, literally denotes a blast of wind, breath, or vapour, striking with force against another body. The word is Latin, formed from *ad* to, and *flare* to blow. Naturalists sometimes speak of the afflatus of serpents. Tully uses the word, figuratively, for a divine inspiration; in which sense, he ascribes all great and eminent accomplishments to a divine afflatus. The Pythian priestesses being placed on a tripod or perforated stool, over a hollow cave, received the divine afflatus, as a late author expresses it, in her belly; and being thus inspired, fell into agitations, like a phrenetic; during which, the pronounced, in hollow groans and broken sentences, the will of the deity. This afflatus is supposed, by some, to have been a subterranean fume, or exhalation, wherewith the priestesses was literally inspired. Accordingly, it had the effects of a real physical disease; the paroxysm of which was so vehement, that Plutarch observes it sometimes proved mortal. Van Dale supposes the pretended enthusiasm of the Pythia to have arisen from the fumes of aromatics.

AFFRAY, or **AFFRAYMENT**, in law, formerly signified the crime of affrighting other persons, by appearing in unusual armour, brandishing a weapon, &c. but, at present, *affray* denotes a skirmish or fight between two or more.

AFFRONTÉE, in heraldry, an appellation given to animals facing one another on a escutcheon; a kind of bearing which is otherwise called *confrontée*, and stands opposed to *adefse*.

AFRANIUS, a Latin poet, who wrote comedies in imitation of Menander, commended by Tully and Quintilian: he lived in the 170th olympiad.

AFRICA (according to Bochart, from a Punic word, signifying *Ears of Corn*) one of the four great divisions, by the moderns called *quarters*, of the world, and one of the three called by the Greeks *ἡσπερος*, or *continents*. By them it was also called *Libya*.

Africa lies south of Europe, and west of Asia. It is bounded on the north by the Mediterranean, which separates it from the former; on the north-east, by the Red-sea which divides it from Asia, and to which it is attached by a neck of land called the *Isthmus of Suez*, about 60 miles over; separating the Mediterranean from the Red-sea. On the west, south, and east, it is bounded by the main ocean: so that it is properly a vast peninsula, bearing some faint resemblance of a pyramid, the base of which is the northern part, running along the shores of the Mediterranean; and the top of the pyramid is the most southerly point, called the *Cape of Good Hope*. Its greatest length from north to south is 4300 miles, and its greatest breadth from east to west is 3500 miles; reaching from Lat. 37° N. to 35° S. and from Long. 17° W. to 50° E.

Though the greatest part of this continent hath been in all ages unknown both to the Europeans and Asiatics, its situation is more favourable than either Europe or Asia for maintaining an intercourse with other nations. It stands, as it were, in the centre of the three other quarters of the globe; and has thereby a much nearer communication with Europe, Asia, and America, than any one of these has with another. For, (1.) It is opposite to Europe in the Mediterranean, for almost 1000 miles in a line from east to west; the distance seldom 100 miles, never 100 leagues, and sometimes not above 20 leagues. (2.) It is opposite to

Asia for all the length of the Red-sea, the distance sometimes not exceeding five leagues, seldom fifty (3.) Its coast for the length of about 2000 miles lies opposite to America at the distance of, from 500 to 700 leagues, including the islands: whereas America, unless where it may be a *terra incognita*, is no where nearer Europe than 1000 leagues; and Asia, than 2500.

As the equator divides this continent almost in the middle, the far greatest part of it is within the tropics; and of consequence the heat in some places is almost insupportable by Europeans, it being there greatly increased by vast deserts of burning sand.—It cannot be doubted, however, that, were the country well cultivated, it would be extremely fertile; and would produce in great abundance not only the necessities, but also the luxuries, of life. It has been asserted, that the sugars of Barbadoes and Jamaica, as also the ginger, cotton, rice, pepper, pimento, cocoa, indigo, &c. of these islands, would thrive in Africa to as much perfection as where they are now produced. Nor can it be doubted, that the East-Indian spices, the tea of China and Japan, the coffee of Mocha, &c. would all thrive in some parts of the African coast; as this continent has the advantage of feeling no cold, the climate being either very warm or very temperate.

Whatever may be the case with the internal parts of Africa, it is certain that its coasts are well watered with many very considerable rivers. The Nile and the Niger may be reckoned among the largest in any part of the world, America excepted. The first discharges itself into the Mediterranean, after a prodigious course from its source in Abyssinia. The origin neither of the Nile, nor of the Niger, is certainly known; but that of the latter is supposed to run through a tract of land little less than 3000 miles. Both these rivers annually overflow their banks, fertilizing by that means the countries through which they pass. The Gambia and Senegal rivers are only branches of the Niger. Many vast ridges of mountains also run through different parts of this continent; but their extent is very little known. Some of the most remarkable are, (1.) Those called *Atlas*, lying between the 20th and 25th degree of north latitude, and supposed almost to divide the continent from east to west. (2.) *The mountains of the moon*, so called on account of their great height; supposed to be the boundaries between Abyssinia and some of the interior kingdoms. (3.) *The mountains of Sierra Leona*, so called on account of their abounding with lions, and likewise supposed to be the boundaries of some of the nations. (4.) Those called by the ancients *the mountains of God*, on account of their being subject to perpetual thunder and lightning. Of all these, however, little more is known than their names.

To what we have already said concerning the produce of Africa, we may add, that no part of the world abounds with gold and silver in a greater degree. Here also are a prodigious number of elephants; and it is surprising, that neither the ancient nor modern Europeans, notwithstanding their extravagant and insatiable thirst after gold and silver, should have endeavoured to establish themselves effectually in a country much nearer to them than either America or the East Indies; and where the objects of their desire are found in equal, if not greater, plenty.

Next to gold and silver, copper is the most valuable metal,

Africa.

metal; and on this continent is found in great plenty, inasmuch that the mountains of Atlas above mentioned are said all to be composed of copper ore. In short, Africa, though a full quarter of the globe, stored with an inexhaustible treasure, and capable of producing almost every necessary, convenience, and luxury of life, within itself, seems to be utterly neglected both by its own inhabitants and all other nations: the former, being in a savage state, are incapable of enjoying the blessings offered them by nature; and the latter taking no farther notice of the inhabitants, or their land, than to obtain at the easiest rate what they procure with as little trouble as possible, or to carry them off for slaves to their plantations in America.

Only a small part of this continent was known to the ancients, *viz.* the kingdom of Egypt, and the northern coast, comprehending little more than what is now known by the name of *Barbary*. It was divided into *Africa Propria*, and *Africa Interior*. *Africa Propria* comprehended only the Carthaginian territories. *Africa Interior* comprehended all other nations to the southward of these territories, or those at a greater distance from Rome. The only kingdoms, however, with which the Romans had any connection, were the Numidians, the Mauritians, and the Gætuli. All these, as well as Egypt, were swallowed up by that enormous power, and reduced to the condition of Roman provinces. But the Romans never seem to have penetrated beyond the tropic of cancer. There appears, indeed, to have been some intercourse between them and the Ethiopians; but the latter always preserved their liberty; and we find their queen Candace mentioned in the times of the apostles, when the Roman power was at its highest pitch.

Between the tropic of cancer and the equinoctial line, a multitude of savage nations were supposed to have their residence, known by the names of Melanogætuli, Nigritæ, Blemmyes, Dolopes, Aftacuri, Lotophagi, Ichthyophagi, Elephantophagi, &c. (which are taken notice of, as well as the others already mentioned, under their proper names); but that Africa was a peninsula, seems to have been totally unknown both to the Europeans and Asiatics for many ages.—It is probable indeed, that some of the Phenicians, and their offspring the Carthaginians, were not so ignorant; as they carried navigation to a much greater height than either the Greeks or Romans: but their discoveries were all concealed with the greatest care, lest other nations should reap the benefit of them; and accordingly we can now find no authentic accounts concerning them. The navigation round Africa, in particular, is recorded by the Greek and Roman writers rather as a strange amusing tale than as a real transaction; and as neither the progress of the Phenician and Carthaginian discoveries, nor the extent of their navigation, were communicated to the rest of mankind, all memorials of their extraordinary skill in naval affairs seem in a great measure to have perished, when the maritime power of the former was annihilated by Alexander's conquest of Tyre, and the empire of the latter was overturned by the Romans.

That the peninsula of Africa, however, was in reality sailed round by the Phenicians, we have on indisputable authority; for some of that nation undertook the voyage, at the command of Necho king

of Egypt, about 604 years before the Christian era. They sailed from a port in the Red-sea, and after three years returned by the Mediterranean: and the very objections that were made to the veracity of their accounts at that time, are unanswerable proofs to us that this voyage was really accomplished. They pretended, that, having sailed for some time, the sun became more and more vertical, after which he appeared in the north, and seemed to recede from them: that as they returned, the sun gradually seemed to move southwards; and, after becoming vertical once more, appeared then in the fourth side of them as before they set out.—This, which we know must certainly have been the case, was deemed incredible at that time, and universal ignorance concerning the extent of this continent prevailed till the 15th century. The first attempts towards attaining a knowledge of Africa was made by the Portuguese in 1412. Notwithstanding their vicinity, they had never ventured beyond Cape *Non*, situated in about N. lat. 27°. it had received its name from a supposed impossibility of passing it. This year they proceeded 160 miles farther, to Cape Bojador; which stretching a considerable way into the Atlantic ocean, with rocky cliffs, appeared so dreadful to the navigators, that they returned without any attempt to pass it. In an attempt to double this formidable cape, they discovered the Madeira islands in 1419; but Cape Bojador continued to be the boundary of their continental discoveries till 1433; when they penetrated within the tropics, and in a few years discovered the river Senegal, Cape de Verd, and the islands which lie off that promontory. In 1449, the western islands, called the *Azores*, were discovered: and in 1471, they first penetrated beyond the line; and were surprised to find, that the torrid zone, contrary to the opinion of the ancients, who imagined it to be burnt up with heat, was not only habitable, but fertile and populous. In 1484, they proceeded 1500 miles beyond the line; so that they began to entertain hopes of finding that way a passage to the East Indies: and two years afterwards, the Cape of Good Hope was discovered by Bartholomew de Diaz; but it was not till the year 1497, that the Portuguese, under Vasquez de Gama, actually doubled this cape, and discovered the true shape of the continent. Thus the coasts of Africa were made perfectly known; and probably the knowledge concerning its interior parts would have been much greater than it is, had not the general attention been called off from this continent by the discovery of America in 1492.

The Romans for a long time maintained their power in Africa: but in the year 426, Bonifacius, supreme governor of all the Roman dominions in this quarter, being compelled to revolt by the treachery of another general called *Aetius*, and finding himself unable to contend with the whole strength of the Roman empire, called in Genserik king of the Vandals to his aid; who thereupon abandoned the provinces he had seized in Europe, and passed over into Africa. Bonifacius, however, being soon after reconciled to his empress Placidia, endeavoured in vain to persuade the Vandals to retire. Hereupon a war ensued, in which the barbarians proved victorious, and quickly over-ran all the Roman provinces in Africa. In the year 435, a peace was concluded; when Numidia and some other countries were ceded to the Vandals, who soon after seized

Africa.

Africa.

all the rest. These barbarians did not long enjoy their ill-gotten possessions: for, about the year 533, Belisarius drove them out, annexing the provinces to the eastern empire; and in 647, the Saracens, having conquered Mesopotamia, Egypt (which anciently was not included in the meaning of the word *Africa*), Phœnicia, Arabia, and Palestine, broke like a torrent into Africa, which they quickly subdued. Their vast empire being in 936 divided into seven kingdoms, the African states retained their independency long after the others were subdued by the Turks: but in the beginning of the 16th century, being afraid of falling under the yoke of Spain, they invited the Turks to their assistance; who first protected, and then enslaved, them. They still continue in a kind of dependence on the Ottoman empire. They are not, however, properly speaking, the *subjects* of the grand Signior, but call him their *protector*, paying him an annual tribute. On the coasts, the natives are almost all addicted to piracy; and with such success have they carried on their employment, that the greatest powers in Europe are become their tributaries, in order to procure liberty to trade on the Mediterranean.

Concerning even these states, which are nearest to Europe, very little is known; but the interior nations are scarce known by name; nor do almost any two of the most learned moderns agree in their division of Africa into kingdoms; and the reason is, that no traveller hath ever penetrated into these inhospitable regions. In the year 1774, indeed, an account appeared in our news-paper and magazines, of a Mr Bruce, who had entered Abyssinia, probably the ancient Ethiopia, where he remained upwards of two years; after which he found means to return, bringing along with him many great curiosities: but this gentleman, contrary to the general disposition of travellers, could never be prevailed upon to make his discoveries public, and disclaimed what was published by others concerning his travels; and indeed none of those vague accounts contained anything very singular, except the horrible custom ascribed to the Abyssinians of eating living animals; which, however problematical, we subjoin in the note †. According to the best accounts we have been able to procure concerning those regions of Africa lying beyond Egypt and Barbary, they are divided in the following manner. On the western coast, to the south of Barbary, lie the kingdoms of Bildulgerid, Zaara, Negroland, Loango, Congo, Angola, Benguela, and Terra de Natal. On the eastern coast beyond Egypt, are those of Nubia, Adel, Ajan, Zanguebar, (between these two a huge desert is interposed), Monomatapa, and Sofala. In the interior parts, the kingdoms of Lower Ethiopia, Abex, Monemuge, and Matanan, are made mention of. The southernmost part, called Cafalaria, is well known for the habitation of the Hottentots, the most degenerate of all the human species.

The chief trade carried on by the Europeans with

the more savage African nations, is the purchasing, or carrying off by force when it is in their power, slaves for their colonies in other countries; and because they have been remarkably successful in this iniquitous trade, it hath been gravely asserted, that these barbarous nations are descended from Canaan the son of Ham, whom Noah cursed, and prophesied that he should be a servant of servants to his brethren: but, not to insist on the absurdity of supposing the villany of any nation a punishment *sent from God*, it may justly be questioned whether the term "servant of servants" will not apply to ourselves rather than to them. Certain it is, that the interior parts of Africa have never been conquered by any nation. A set of lawless banditti, pretending to be descended from other vagabonds driven out of Troy by the Greeks, enslaved the greatest part of the known world, and this island among the rest. After a number of ages, the Romans were driven out by other banditti, and these again by others; so that for a space of time much longer than the slave-trade hath yet existed, the European and most Asiatic nations were servants to those who had themselves been accounted the most contemptible of the human race; but during all this time the Africans enjoyed liberty, and do still enjoy it, notwithstanding the wicked advantages the Europeans take of the barbarism of the negroes to make them sell one another. No European nation hath ever made a nation of negroes yield up their country to them, or pay them an annual tribute; nor have they even been able to introduce their customs among them; so that, on the whole, instead of being the greatest slaves, we cannot help thinking the barbarous nations in Africa are the only people on earth that have never yet been enslaved by others.—The most probable conjectures concerning the peopling, &c. of those kingdoms of Africa concerning which we have any credible accounts, are mentioned under their proper names, as they occur in the order of the alphabet.

AFRICAN COMPANY, a society of merchants, established by King Charles II. for trading to Africa; which trade is now laid open to all his majesty's subjects, paying 10 *per cent.* for maintaining the forts.

AFRICANUS (Julius), an excellent historian of the third century, the author of a chronicle which was greatly esteemed, and in which he reckons 5500 years from the creation of the world to Julius Cæsar. This work, of which we have now no more than what is to be found in Eusebius, ended at the 221st year of the vulgar era. Africanus also wrote a letter to Origen on the history of Sufanna, which he reckoned supposititious; and we have still a letter of his to Aristides, in which he reconciles the seeming contradictions in the two genealogies of Christ recorded by St Matthew and St Luke.

AFT, in the sea-language, the same with ABAFT.

AFTER-BIRTH, in midwifery, signifies the membranes

Africa
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After-
birth.

† "Not satisfied (say these accounts) with devouring raw flesh, their custom is to cut collops from live animals, which they tear to pieces with their teeth while warm and palpitating with vital motion. The flesh of an animal after it is dead they account quite unsavoury. The most expert butcher among them is he who can cut most flesh from a beast before it is deprived of its life; for doing which the utmost attention is necessary to avoid the great arteries, or those parts the destruction of which will soon bring on death. A company of Abyssinians at dinner is a horrible spectacle: they are seated, each with a cake of flour in his hand; live cattle are brought to the door, and the inhuman butcher cuts morsels off them, which are instantly carried in to the company, who lay them upon their cakes, and eat them directly, all bathed in the tepid blood of the miserable animals, whose lowings and groanings, through violence of anguish, serve for a dinner-bell, or music, to the flocking barbarians."

After-
math
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Agamem-
non.

branes which surround the infant in the womb, generally called the secundines.

AFTER-MATH, in husbandry, signifies the grass which springs or grows up after mowing.

AFTER-NOON, the latter half of the artificial day, or that space between noon and night.

AFTER-PAINS, in midwifery, excessive pains felt in the groin, loins, &c. after the woman is delivered.

AFTER-SWARMS, in the management of bees, are those which leave the hive some time after the first has swarmed. See *Apis*.

AFWESTAD, a large copper-work belonging to the crown of Sweden, which lies on the Dala, in the province of Dalecarlia, in Sweden. It looks like a town, and has its own church. Here they make copper plates; and have a mint for small silver coin, as well as a royal post-house. W. Long. 14. 10. N. Lat. 58. 10.

AGA, in the Turkish language, signifies a great lord or commander. Hence the Aga of the Janissaries is the commander in chief of that corps; as the general of horse is denominated *spahiclar aga*. The aga of the janissaries is an officer of great importance. He is the only person who is allowed to appear before the Grand Signior without his arms across his breast in the posture of a slave. Eunuchs at Constantinople are in possession of most of the principal posts of the seraglio: The title *aga* is given to them all, whether in employment or out. We find also *agas* in other countries. The chief officers under the Khan of Tartary are called by this name. And among the Algerines, we read of *agas* chosen from among the *boluk bashis* (the first rank of military officers), and sent to govern in chief the towns and garrisons of that state. The *aga* of Algiers is the president of the divan, or senate. For some years, the *aga* was the supreme officer; and governed the state in the place of bashaw, whose power dwindled to a shadow. But the soldiery rising against the *boluk bashis*, or *agas*, massacred most of them, and transferred the sovereign power to the calif, with the title of *Dey*, or King.

AGADES, a kingdom and city of Negroland in Africa. It lies nearly under the tropic of Cancer, between Gubur and Cano. The town stands on a river that falls into the Niger; it is walled, and the king's palace is in the midst of it. The king has a retinue, who serve as a guard. The inhabitants are not so black as other Negroes, and consist of merchants and artificers. Those that inhabit the fields are shepherds or herdsmen, whose cottages are made of boughs, and are carried about from place to place on the back of oxen. They are fixed on the spot of ground where they intend to feed their cattle. The houses in the city are stately, and built after the Barbary fashion. This kingdom was, and be may still, tributary to the king of Tombut. It is well watered; and there is great plenty of grass, cattle, fenna, and manna. The prevailing religion is the Mahometan, but very loosely professed. N. Lat. 26. 10. E. Long. 9. 10.

AGALOCHEUM. See *MATERIA MEDICA*, n° 75.

AGALMATA, in antiquity, a term originally used to signify any kind of ornaments in a temple; but afterwards for the statues only, as being most conspicuous.

AGAMEMNON, the son of Atreus by Hecuba, was captain-general of the Trojan expedition. It was foretold to him by Cassandra, that his wife Clytemnestra

would be his death: yet he returned to her; and accordingly was slain by Ægisthus, who had gained upon his wife in his absence, and by her means got the government into his own hands.

AGANIPPIDES, in ancient poetry, a designation given to the mules, from a fountain of mount Helicon called *Aganippe*.

AGANIPPE, in antiquity, a fountain of Boeotia at mount Helicon, on the borders between Phocis and Boeotia, sacred to the mules, and running into the river Permessus; (Pliny, Paufanias.) Ovid seems to make *Aganippe* and *Hippocrene* the same. Solinus more truly distinguishes them, and ascribes the blending them to poetical licence.

AGAPE, in ecclesiastical history, the love-feast, or feast of charity, in use among the primitive Christians; when a liberal contribution was made by the rich to feed the poor. The word is Greek, and signifies love.—St Chrysostom gives the following account of this feast, which he derives from the apostolical practice. He says, "the first Christians had all things in common, as we read in the Acts of the Apostles; but when that equality of possessions ceased, as it did even in the Apostles time, the agape, or love-feast, was substituted in the room of it. Upon certain days, after partaking of the Lord's supper, they met at a common feast; the rich bringing provisions, and the poor who had nothing being invited." It was always attended with receiving the holy sacrament; but there is some difference between the ancient and modern interpreters as to the circumstance of time, viz. Whether this feast was held before or after the communion. St Chrysostom is of the latter opinion; the learned Dr Cave of the former.—These love-feasts, during the three first centuries, were held in the church; but at length such abuses were committed at them, that the councils of Laodicea and Carthage prohibited the practice for the future.

AGAPETÆ, in church-history, a name given to those young maidens who frequented the company of ecclesiastics out of a motive of piety and charity. This practice afterwards degenerated into an occasion of libertinism, inasmuch that *agapetæ* became a term of reproach.

AGARD (Arthur), a learned English antiquarian, born at Tolton in Derbyshire in the year 1540. His fondness for English antiquities induced him to make many large collections; and his office as deputy chamberlain of the exchequer, which he held 45 years, gave him great opportunities of acquiring skill in that study. Similarity of taste brought him acquainted with Sir Robert Cotton, and other learned men, who associated themselves under the name of *The Society of Antiquarians*, of which society Mr Agard was a conspicuous member. He made the doomday-book his peculiar study; and composed a work purposely to explain it, under the title of *Tractatus de usu et obscurioribus verbis libride Domesday*: he also compiled a book for the service of his successors in office, which he deposited with the officers of the king's receipt, as a proper index for succeeding officers. All the rest of his collections, containing at least twenty volumes, he bequeathed to Sir Robert Cotton; and died in 1615.

AGARICUS, or MUSHROOM, a genus of the order of fungi, belonging to the cryptogamia class of plants. *Species*. Botanical writers enumerate 55 species belonging

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Agaricus.

Agaricus,
or
Mushroom.

longing to this genus; of which the most remarkable are the following. 1. The chantarellus, or champignon mushroom, has a turban-shaped hat, rather flat; with branched yellow gills running down the pillar; the pillar short and naked, mostly of a pale yellow, but sometimes of a deep and even saffron colour. They are excellent food, and have a fine flavour. Of this species there are two varieties; one called the *common*, and the other the *cup, mushroom*: these have the border of the hat not circular, but running into angles; reflected upwards, in form of an inverted cone, or drinking-glass; yellow, and when full grown with a tinge of red; the stalk very short and thick. They are found in the meadows and pastures, and in woods. The French and Italians eat them.—2. The variegatus, or variegated mushroom, has a very long variegated stalk and broad hat. It is of a finer flavour than the common mushroom.—3. The *muscaria*, or reddish mushroom, has a large hat almost flat, either white, red, or crimson, sometimes beset with angular red warts; the gills white, flat, and inversely spear-shaped; the pillar hollow, the cap fixed to the middle of the pillar, limber, and hanging down. This species grows in pastures, and is said to destroy bugs effectually if the juice is rubbed upon the walls and bed-posts. The inhabitants of the north of Europe, whose houses are greatly infested with flies at the decline of summer, infuse it in milk, and fit it in their windows, and the flies upon tasting the least drop are instantly poisoned. An infusion of common pepper in milk answers the same purpose, but the flies through time become wise enough not to taste it; and though vast numbers are at first destroyed, it is impossible to clear a house of these insects by this means.—4. The *campetris*, or common mushroom, has a scaly, whitish, and convex hat; the gills of a brownish red; the pillar cylindrical, above the cap smooth and white, below it ash-coloured. The degree of convexity and colour of the gills of this mushroom depend upon its age. At its first appearance it is smooth, and almost globular; the edges of the hat press upon the pillar; and the gills, which are then almost white, are covered with a white membrane extending from the edge of the hat to the summit of the pillar. In this state it is called a *button*: by degrees it expands, the membrane bursts, the edges of the hat remove from the pillar, and the gills are exposed to view, of a bright flesh colour; this, however, soon fades, and sinks at length into a dark brown or chocolate. The hat now loses its convexity, and becomes almost flat, rough, and scaly. Of this species there are several varieties; particularly one with a broad hat, white above; the gills very numerous, and of a pale red or flesh colour; the stalk short, and pretty thick. It is found in parks and lands that have been long unploughed, commons and poor lands, in pastures, and in woods. This species constitutes one of the corner-stones of modern luxury; either dressed in substance, or boiled up with wine and spices under the name of *catchup*. The seeds are contained in the substance of the gills; each of which is composed of two layers, and betwixt these layers are the seeds, which fall to the ground when ripe. Some of them in their fall are caught upon the cup, and detained on its woolly surface, where, by the assistance of a microscope, they may be easily found.—5. The *viridis*, or green mushroom, is large, and of a whitish green; the flesh is of a fine flavour. It grows in woods.

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—6. The *seruginosus* or *verdigrise* mushroom, is of a moderate size, and covered with a mucus of a verdigrise colour. It is only to be found in the garden belonging to the company of apothecaries at London, and in St James's park. It has also been observed in a gravel-pit in the middle of September.—7. The *clypeatus*, or long-stalked mushroom, has an hemispherical hat tapering to a point, and clammy; the pillar long, cylindrical, and white; the gills white, and not concave; dusted with a fine powdery substance on each side; the root bulbous, long, and hooked at the end. It is found in September, in woodlands and pastures. This species is thought to be poisonous; and we have the following account of the symptoms produced by eating it, in Dr Percival's Essays. "Robert Usherwood, of Middleton, near Manchester, a strong healthy man, aged 50 years, early in the morning gathered and eat what he supposed to be a mushroom. He felt no symptoms of indisposition, till five o'clock in the evening; when, being very thirsty, he drank near a quart of table-beer. Soon afterwards he became universally swollen, was sick, and in great agonies. A severe vomiting and purging succeeded, with violent cramps in his legs and thighs. He discharged several pieces of the fungus, but with little or no relief. His pains and evacuations continued, almost without intermission, till the next night; when he fell into a sound sleep, and awaked in the morning perfectly easy, and free from complaint."—Many of the different species of this genus grow on cows or horses dung, on dunghills, on rotten wood, in cellars, or on the trunks of trees; of which the most remarkable is, 8. The *quercinus*, or *agaric* of the oak. This is of various sizes, sometimes not exceeding the bigness of the fist, sometimes as large as a man's head. It takes at least an year or two to grow to its full size. There are two kinds of it, called by the ancients *mas* and *femina*: the male is dark coloured, hard, heavy, and woody; it is sometimes used by the dyers, as an ingredient in the black dye. The female, or official *agaric*, is covered with a hard blackish rind like the other; but when the cortical part is pared off, the internal substance appears quite white; by age it changes a little yellowish. It should be very light, porous, easy to break, and free from any hard pieces or compact veins. It tastes at first sweetish in the mouth, but presently becomes very bitter and nauseous. It is an article in the *Materia Medica**; but deserves the name of a poison, rather than of a medicine.

Culture. Only the esculent kinds of mushrooms are cultivated; and the following method is used by the gardeners who raise them for sale.—If the young mushrooms cannot be procured from gardens, they must be looked for in rich pastures during the months of August and September: the ground must be opened about their roots, where it is frequently found full of small white knots; which are the off-sets, or young mushrooms. These must be carefully gathered in lumps, with the earth about them: but as this spawn cannot be found in the pasture, except at that season when the mushrooms are naturally produced, it may be searched for at any time in old dung-hills, especially where there has been much litter, and it hath not been penetrated by wet so as to rot: it may also be found very often in old hot-beds; or it may be procured by mixing some long dung from the stable, which has not been

Agaricus,
or
Mushroom.

* See *Materia Medica*,
no 76.

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thrown

Agaricus,
or
Mushroom.

Agaricus,
or
Mushroom.

thrown on a heap to ferment, with strong earth, and put under cover to prevent wet getting to it. The spawn commonly appears in about two months after the mixture is made; but proportionably sooner the more effectually the air is excluded, provided the mixture is not kept so close as to heat. Old thatch, or litter which has lain long abroad so as not to ferment, is the best covering. The spawn has the appearance of white mould shooting out into long strings, by which it may be easily known wherever it is met with.—The beds for receiving the spawn are now to be prepared. These should be made of dung in which there is plenty of litter, but which should not be thrown on a heap to ferment: that dung which has lain spread abroad for a month or longer, is best. The beds should be made on dry ground, and the dung laid on the surface; the width at the bottom should be two and a half or three feet, the length in proportion to the quantity of mushrooms desired; then lay the dung about a foot thick, covering it with strong earth about four inches deep. Upon this lay more dung, about 10 inches thick; then another layer of earth, still drawing in the sides of the bed, so as to form it like the roof of a house; which may be done by three layers of dung, and as many of earth. When the bed is finished, it must be covered with litter or old thatch, both to prevent its drying too fast, and to keep out wet. In this situation it ought to remain eight or ten days, when it will be in a proper temperature to receive the spawn; for this is destroyed by too much heat; though, before planting, it may be kept very dry, not only without detriment, but with considerable advantage.—The bed being in a proper temperature for the spawn, the covering of litter should be taken off, and the sides of the bed smoothed; then a covering of light rich earth, about an inch thick, should be laid all over the bed; but this should not be wet. Upon this the spawn must be thrust, laying the lumps two or three inches asunder: then gently cover this with the same light earth, above half an inch thick; and put the covering of litter over the bed, laying it so thick as to keep out wet, and prevent the bed from drying. In spring or autumn the mushrooms will begin to appear, perhaps in a month after making; but when the beds are made in summer or winter, they are much longer before they produce. In any season, however, they ought not to be hastily destroyed; since mushroom-beds have been known to produce very plentifully, even after the spawn has lain in them five or six months. When the beds are destroyed, the spawn should be carefully preserved, and laid up in a dry place, at least five or six weeks before it is again planted.—The difficulty of managing mushroom-beds is, to keep them always in a proper degree of moisture. In the summer season they may be uncovered to receive gentle showers of rain at proper times; and in long dry seasons the beds should now and then be watered, but much wet ought by no means to be suffered to come to them. During the winter season they must be kept as dry as possible, and so closely covered as to keep out cold. In frosty, or very cold weather, if some warm litter, shaken out of a dung-heap, is laid on, the growth of the mushrooms will be promoted: but betwixt this and the bed, a covering of dry litter must be interposed; which should be renewed as it decays; and, as the cold increases, the covering must be

thickened. By attending to these directions, plenty of mushrooms may be produced all the year round. One bed will continue good for many months.

In the Ephemerides of the Curious we find mention made of a stone, called by Dr John George Wolckarius, who saw one in Italy, *Lapis Lycarius*, which never ceases to produce in a few days mushrooms of an excellent flavour by the most simple and easy process imaginable. “It is (says he) of the bigness of an ox’s head, rough and uneven on its surface, and on which also are perceived some clefts and crevices. It is black in some parts, and in others of a lighter and greyish colour. Internally it is porous, and nearly of the nature of the pumice-stone, but much heavier; and it contains a small piece of flint, which is so incorporated with it as to appear to have been formed at the same time the stone itself received its form. This gives room to judge, that those stones have been produced by a fat and viscid juice, which has the property of indurating whatever matter it filtrates into. The stone here spoken of, when it has been lightly covered with earth, and sprinkled with warm water, produces mushrooms of an exquisite flavour; which are usually round, sometimes oval, and whose borders, by their inflexions and different curvities, represent in some measure human ears. The principal colour of these mushrooms is sometimes yellowish, and sometimes of a bright purple; but they are always disseminated with different spots, of a deep orange colour, or red brown; and when these spots are recent, and still in full bloom, they produce a very agreeable effect to the sight. But what appears admirable is, that the part of the stalk which remains adhering to the stone, when the mushroom has been separated from it, grows gradually hard, and petrifies in time, so that it seems that this fungus restores to the stone the nutritive juice it received from it, and that it thus contributes to its increase.” John Baptist Porta pretends, that this stone is found in several parts of Italy; and that it is not only to be met with at Naples, taken out of mount Veluvius; but also on mount Pantherico, in the principality of Arellino; on mount Garganus, in Apulia; and on the summit of some other very high mountains. He adds, that the mushrooms which grow on those sorts of stones, and are usually called *fungi lycarii*, have the property of dissolving and breaking the stone of the kidneys and bladder; and that, for this purpose, nothing more is required than to dry them in the shade, and being reduced to powder, to make the patient, fasting, take a sufficient quantity of this powder, in a glass of white-wine, which will so cleanse the excretory ducts of the urine, that no stones will ever after be collected in them. As to the form of those mushrooms, their root is stony, uneven, divided according to its longitudinal direction, and composed of fibres as fine as hairs, interwoven one with another. Their form on first shooting out resembles a small bladder scarce then larger than the bud of a vine; and, if in this state they are squeezed between the fingers, an aqueous subacid liquor issues out. When they are at their full growth, their pedicle is of a finger’s length, larger at top than at bottom, and becomes insensibly slender in proportion as it is nearer the earth. These mushrooms are also formed in an umbella, and variegated with an infinity of little specks situate very near one another. They are smooth and even on the upper part,

but

Agate, but underneath leafy like the common mushrooms. Their taste is likewise very agreeable, and the fck are not debarr'd eating of them when they have been dresd in a proper manner. Curiosity having prompted some naturalists and physicians to submit these stones to a chemical analysis, in order to be more competent judges of the uses they might be put to in medicine, there first came forth, by distillation, an insipid water, and afterwards a spirituous liquor. The retort having been heated to a certain point, there arose an oil, which had nearly the smell and taste of that of guaiacum; and a very acrid salt was extract'd from the ashes.

Mineral AGARIC, a marley earth resembling the vegetable of that name in colour and texture. It is found in the fissures of rocks; and on the roofs of caverns; and is sometimes used as an astringent in fluxes, hæmorrhages, &c.

AGATE, or **ACHAT,** (among the Greeks and Latins, *Αχάτης*, and *Achat*, from a river in Sicily, on the banks of which it was first found), a very extensive genus of the fempellucid gems.

These stones are variegated with veins and clouds, but have no zones like those of the onyx. They are compos'd of crystal debas'd by a large quantity of earth, and not form'd, either by repeated incrustations round a central nucleus, or made up of plates laid evenly on one another; but are merely the effect of one simple concretion, and variegated only by the disposition given, by the fluid they were form'd in, to their differently coloured veins or matters.

Agates are arranged according to the different colours of their ground. Of those with a *white* ground there are three species. (1.) The *dendrachates**, *moca* stone, or *arborescent agat*. This seems to be the same with what some authors call the *achates* with rosemary in the middle, and others *achates* with little branches of black leaves. (2.) The *dull milky-looking agate*. This, though greatly inferior to the former, is yet a very beautiful stone. It is common on the shores of rivers in the East Indies, and also in Germany and some other parts of Europe. Our lapidaries cut it into counters for card-playing, and other toys of small value. (3.) The *lead-coloured agate*, called the *phassachates*† by the ancients.

Of the agates with a *reddish* ground there are four species. (1.) An impure one of a flesh-coloured white, which is but of little beauty in comparison with other agates. The admixture of flesh-colour is but very flight; and it is often found without any clouds, veins, or other variegations; but sometimes it is prettily veined or variegated with spots of irregular figures, having fimbriated edges. It is found in Germany, Italy, and some other parts of Europe; and is wrought into toys of small value, and often into the German gunflints. It has been sometimes found with evident specimens of the perfect mosses bedded deep in it. (2.) That of a pure blood colour, called *hæmachates*‡, or the *bloody agate*, by the ancients. (3.) The clouded and spotted agate, of a pale flesh colour, called by the ancients the *carnelian agate*, or *sardachates*§. (4.) The red-lead-coloured one, variegated with yellow, called the *coral agate*, or *corallo-achates*¶, by the ancients.

Of the agates with a *yellowish* ground there are only two known species: the one of the colour of yel-

low wax, called *cerachates* by the ancients; the other a very elegant stone, of a yellow ground, variegated with white, black, and green, called the *leonina*, and *leonteseres*†, by the ancients.

Lastly, Of the agates with a *greenish* ground, there is only one known species, called by the ancients *jaspachates*‡.

Of all these species there are a great many varieties; some of them having upon them natural representations of men and different kinds of animals, &c. These representations are not confined to the agates whose ground is of any particular colour, but are occasionally found on all the different species. Velfchius had in his custody a flesh-coloured agate, on one side of which appeared a half-moon in great perfection, represented by a milky semicircle; on the other side, the phases of *vesper*, or the evening-star; whence he denominated it an *aphrodisian agate*. An agate is mentioned by Kircher*, on which was the representation of a heroine armed; and one in the church of St Mark in Venice has the representation of a king's head adorned with a diadem. On another, in the museum of the prince of Gonzaga, was represented the body of a man with all his clothes in a running posture. A still more curious one is mentioned by de Boot†, wherein appears a circle struck in brown, as exactly as if done with a pair of compasses, and in the middle of the circle the exact figure of a bishop with a mitre on: but inverting the stone a little, another figure appears; and if it is turned yet further, two others appear, the one of a man, and the other of a woman. But the most celebrated agate of this kind is that of Pyrrhus, wherein were represented the nine muses, each with their proper attributes, and Apollo in the middle playing on the harp||. In the emperor's cabinet is an oriental agate of a surprising bigness, being fashioned into a cup, whose diameter is an ell, abating two inches. In the cavity is found delineated in black specks, *Α. ΧΡΙΣΤΟΣ. Σ. ΧΧΧ.* Other agates have also been found, representing the numbers 4191, 191; whence they were called *arithmetical* agates, as those representing men or women have obtained the name of *anthropomorphous*.

Great medicinal virtues were formerly attributed to the agate, such as resisting poisons, especially those of the viper, scorpion, and spider; but they are now very justly rejected from medicinal practice. The oriental ones are all said to be brought from the river Gambay. A mine of agates was some time ago discovered in Transylvania, of divers colours; and some of a large size, weighing several pounds.

Agates may be stained artificially with solution of silver in spirit of nitre, and afterwards exposing the place to the sun‡; and though these artificial colours disappear on laying the stone for a night in aquafortis, yet a knowledge of the practicability of thus staining agates, must render those curious figures above-mentioned strongly suspected of being the work not of nature, but of art. Some account for these phenomena from natural causes. Thus, Kircher, who had seen a stone of this kind in which were depicted the four letters usually inscribed on crucifixes, *I. N. R. I.* apprehends that some real crucifix had been buried underground, among stones and other rubbish, where the inscription happening to be parted from the cross, and to be received among a soft mould or clay susceptible

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† See *Leonteseres*.

‡ See *Jaspachates*.

* Ephem. German. dec. i. an. 17. obs. 151.

† De Gem. l. ii. c. 95.

|| Pliny, lxxxvii. c. 3.

* See *Dendrachates*.

† See *Phassachates*.

‡ See *Hæmachates*.

§ See *Sardachates*.

¶ See *Corallo-achates*.

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of the impression of the letters, came afterwards to be petrified. In the same manner he supposes the agate of Pyrrhus to have been formed. Others resolve much of the wonder into fancy, and suppose those stones formed in the same manner with the *cameaux* * or Florentine stones.

The agate is used for making cups, rings, seals, handles for knives and forks, hilts for swords and hangers, beads to pray with, smelling-boxes, patch-boxes, &c. being cut or fawed with no great difficulty. At Paris, none have a right to deal in this commodity except the wholesale mercers and goldsmiths. The sword-cutlers are allowed to sell it, but only when made into handles for *contaux de chasie*, and ready set in. The cutlers have the same privilege for their knives and forks.

Considerable quantities of these stones are still found near the river Achates in Sicily. There are found in some of these the surprising representations above-mentioned, or others similar to them. By a dextrous management of these natural stains, medals have been produced, which seem master-pieces of nature: for this stone bears the graver well; and as pieces of all magnitudes are found of it, they make all sorts of work it. The high altar of the cathedral of Messina is all over encrusted with it. The lapidaries pretend that the Indian agates are finer than the Sicilian; but father Labat * informs us, that in the same quarries, and even in the same block, there are found pieces much finer than others, and these fine pieces are sold for Indian agates in order to enhance their price.

AGATE, among antiquaries, denotes a stone of this kind engraven by art. In this sense, agates make a species of antique gems, in the workmanship whereof we find eminent proofs of the great skill and dexterity of the sculptors. Several agates of exquisite beauty are preserved in the cabinets of the curious; but the facts or histories represented on these antique agates, however well executed, are now become so obscure, and their explications so difficult, that several diverting mistakes and disputes have arisen among those who undertook to give their true meaning.

The great agate of the apotheosis of Augustus, in the treasury of the holy chapel, when sent from Constantinople to St Lewis, passed for a triumph of Joseph. An agate now in the French king's cabinet, had been kept 700 years with great devotion, in the Benedictine abbey of St Evre at Toul, where it passed for St John the evangelist carried away by an eagle, and crowned by an angel; but the heathenism of it having been lately detected, the religious would no longer give it a place among their relics, but presented it in 1684 to the king. The antiquaries found it to be the apotheosis of Germanicus. In like manner the triumph of Joseph was found to be a representation of Germanicus and Agrippina, under the figures of Ceres and Triptolemus. Another was preserved, from time immemorial, in one of the most ancient churches of France, where it had passed for a representation of paradise and the fall of man; there being found on it two figures representing Adam and Eve, with a tree, a serpent, and an Hebrew inscription round it, taken from the third chapter of Genesis, "The woman saw that the tree was good, &c." The French academists, instead of our first parents, found Jupiter and Minerva represented by the two figures: the inscription was of

a modern date, written in a Rabbinical character, very incorrect, and poorly engraven. The prevailing opinion was, that this agate represented simply the worship of Jupiter and Minerva at Athens.

AGATE, is also a name of an instrument used by gold-wire-drawers; so called from the agate in the middle of it, which forms its principal part.

AGATHIAS, or, as he calls himself in his epigrams, AGATHIUS, distinguished by the title of *Scholeasticus*, a Greek historian in the 6th century under Justinian. He was born at Myrina, a colony of the ancient *Æolians*, in Asia the less, at the mouth of the river Phythicus. He was an advocate at Smyrna. Tho' he had a taste for poetry, he was yet more famous for his history, which begins with the 26th year of Justinian's reign, where Procopius ends. It was printed in Greek and Latin, with Bonaventura Vulcanius's, at Leyden, 1594, in 4^{to}; and in Paris at the king's printing-house, 1660, in folio.

AGATHO, a tragic and comic poet, disciple to Prodicus and Socrates, applauded in Plato's dialogues for his virtue and beauty. His first tragedy obtained the prize; and he was crowned in the presence of upwards of 30,000 men, the 4th year of the 90th Olympiad. There is nothing now extant of his, except a few quotations in Aristotle, Athenæus, and others.

AGATHOCLES, the famous tyrant of Sicily, son of a potter at Reggio. He was a thief, common soldier, centurion, general, and a pirate, all in a regular succession. He defeated the Carthaginians several times in Sicily, and was once defeated himself. He first made himself tyrant of Syracuse, and then of all Sicily; after which, he vanquished the Carthaginians again both in Sicily and Africa. But at length having ill success, and being in arrears with his soldiers, they mutinied, forced him to fly his camp, and cut the throats of his children, whom he left behind. Recovering himself again, he relieved Corfu, besieged by Cassander; burnt the Macedonian fleet; returned to Sicily, murdered the wives and children of those who had murdered his; afterwards meeting with the soldiers themselves, he put them all to the sword; and ravaging the sea-coast of Italy, took the city of Hipponium. He was at length poisoned by his grandson Archagathus, in the 72^d year of his age, 290 years before Christ, having reigned 28 years.

AGATHYRNA, or AGATHYRNUM, AGATHYRSA, (Polybius.) AGATHYRSUM, (Strabo;) a town of Sicily; now *S. Marco*; as old as the war of Troy, being built by Agathyrnus, son of *Æolus*, on an eminence. The gentilium name is *Agathyrneus*; or, according to the Roman idiom, *Agathyrnesis*.

AGAVE, the common American aloë; a genus of the monogynia order belonging to the hexandria class of plants. Of this genus, botanical writers enumerate eight

Species. 1. The Americana, or great American aloë. The stems of this, when the plants are vigorous, generally rise upwards of 20 feet high, and branch out on every side towards the top, so as to form a kind of pyramid: the slender shoots being garnished with greenish yellow flowers, which stand erect, and come out in thick clusters at every joint: these make a fine appearance, and continue long in beauty; a succession of new flowers being produced for near three months in favourable seasons, if the plant is protected from the autumnal colds.

Agate
Agave.* See *Cameaux*.* Voyage d'
Ital. tom. v.
p. 158.Hist. Acad.
R. Inscript.
tom. i. p. 337.
— 344.

Agave,
Agave.

Agave.

colds. The seeds do not ripen in England. It has been generally thought, that these plants do not flower till they are 100 years old: but this is a mistake; for the time of their flowering depends on their growth: so that in hot countries where they grow fast, and expand many leaves every season, they will flower in a few years; but in colder climates, where their growth is slow, it will be much longer before they shoot up their stem. There is a variety of this species with striped leaves, which are pretty common in the English gardens. 2. The Virginia, or American aloe, with a simple stalk. This so much resembles the last, as to be distinguishable only by good judges. The principal difference is, that the leaves of this are narrower toward their extremity, and of a paler colour: the stems of this sort do not rise so high as the first, nor do they branch in the same manner, but the flowers are collected into a close head at the top; they are, however, of the same shape and colour. 3. The fetida, or piet, hath long, narrow, stiff leaves, of a pale green colour: the plants rarely grow above three feet in height, but the flower-stem rises to near 20, and branches out much like that of the first, but more horizontally: the flowers are of the same shape, but smaller, and of a greener colour. After the flowers are past, instead of seed-vessels, young plants succeed them; which, falling off, are to be received in pots, where they soon take root, and become perfect. This sort never sends out off-sets from the roots; so that it can only be multiplied when it flowers; and presently after the young plants have dropped off, the old one dies. 4. The tuberosa, or American aloe with a tuberous root, agrees with the last in its general characters; only that the leaves are indented, and each of them terminates in a strong thorn. 5. The vivipara, so called from its producing young plants after the flowers are fallen off, never grows to a large size; the flower-stem rises to about 12 feet in height, and branches out in the same manner as the third sort, with which it agrees in most of its other properties. 6. The karratto is as yet so little known in Britain, that no particular description of it can be given. 7. The Vera Cruz so greatly resembles the first as to be scarce distinguishable. 8. The rigida hath long narrow stiff leaves, which are entire, and terminated by a stiff black spine. It is very little known.

Culture. The third, fourth, fifth, sixth, and eighth sorts are so tender, that they cannot be preserved thro' the winter in England unless they are placed in a warm stove; nor will they thrive when set abroad in summer, and therefore must constantly remain in the stove, observing to let them enjoy a large share of free air in warm weather. They require a light sandy earth, and should have little wet in winter; but, in warm weather, may be gently watered twice a-week. They should be shifted every summer into fresh pots: but these must not be too large; for if their roots are not confined, they will not thrive. Such as send out off-sets from their roots may be propagated by them; the others, from seeds obtained from the countries where they grow, or the young plants produced at flowering time.

AGDE, a city of France, in Lower Languedoc, in the territory of Agadez, with a bishop's see. The diocese is small, but it is one of the richest countries in

the kingdom. It produces fine wool, wine, oil, corn, and silk. It is seated on the river Eraut, a mile and a quarter from its mouth, where it falls into the gulph of Lyons, and where there is a fort built to guard its entrance. It is well peopled; the houses are built of black stone, and there is an entrance into the city by four gates. The greatest part of the inhabitants are merchants or seamen. The public buildings are but mean: the cathedral is small, and not very handsome: the bishop's palace is an old building, but convenient enough. The city is extended along the river, where it forms a little port, wherein small craft may enter. There is a great concourse of pilgrims and other devout people to the chapel of Notre Dame de Grace. It is a little without the city, between which and the chapel there are about 13 or 14 oratories, which they visit with naked feet. The convent of the Capuchins is well built, and on the outside are lodgings and apartments for the pilgrims who come to perform their *neuvaine* or nine days devotion. The chapel, which contains the image of the Virgin Mary, is distinct from the convent. E. Long. 3. 20. Lat. 43. 19.

AGE, in the most general sense of the word, signifies the duration of any being, from its first coming into existence to the time of its peaking of it, if it still continues; or to its destruction, if it has ceased to exist some time before we happen to mention it.

Among the ancient poets, this word was used for the space of thirty years; in which sense, *age* amounts to much the same with *generation*. Thus, Nestor is said to have lived *three ages*, when he was 90 years old.—By ancient Greek historians, the time elapsed since the beginning of the world is divided into three periods, which they called *ages*. The first reaches from the creation to the deluge which happened in Greece during the reign of Ogyges; this they called the *obscure* or *uncertain* age, because the history of mankind is altogether uncertain during that period. The second they call the *fabulous* or *heroic* age, because it is the period in which the fabulous exploits of their gods and heroes are said to have been performed. It began with the Ogygian deluge, and continued to the first Olympiad; where the third, or *historical*, age commenced.—This division, however, it must be observed, holds good only with regard to the Greeks and Romans, who had no histories earlier than the first Olympiad; the Jews, Egyptians, Phenicians, and Chaldees, not to mention the Indians and Chinese who pretend to much higher antiquity, are not included in it.

The interval since the first formation of man has been divided by the poets into four *ages*, distinguished by the epithets of *golden*, *silver*, *brazen*, and *iron*. During the *golden* age, Saturn reigned in heaven, and justice and innocence in this lower world. The earth then yielded her productions without culture; men held all things in common, and lived in perfect friendship. This period is supposed to have lasted till the expulsion of Saturn from his kingdom. The *silver* age commenced when men began to deviate from the paths of virtue; and in consequence of this deviation, their lives became less happy. The *brazen* age commenced on a farther deviation, and the *iron* age took place in consequence of one still greater.—A late author, however, reflecting on the barbarism of the first ages, will have the order which the poets assign to the four ages inverted;

Age.

Age
Ager.

ed; the first being a time of rudeness and ignorance, more properly denominated an *iron*, than a *golden* age. When cities and states were founded, the *silver* age commenced; and, since arts and sciences, navigation and commerce, have been cultivated, the *golden* age has taken place.

In some ancient northern monuments, the *rocky* or *fiery* age corresponds to the *brazen* age of the Greeks. It is called *rocky*, on account of Noah's ark, which rested on mount Ararat; whence men were said to be defended or sprung from mountains: or from Deucalion and Pyrrha, restoring the race of mankind, by throwing stones over their heads. The northern poets also style the fourth age of the world the *ashen* age, from a Gothic king Madenis, or Mannus, who on account of his great strength was said to be made of ash, or because in his time people began to make use of weapons made of that wood.

Among the Jews, the duration of the world is also divided into three *ages*. (1.) The *seculum inane*, or *void age*, was the space of time from the creation to Moses; (2.) The *present age*, denotes all the space of time from Moses to the coming of the Messiah; and, (3.) The *age to come*, denotes the time from the coming of the Messiah to the end of the world.

Various other divisions of the duration of the world into *ages* have been made by historians.—The Sibylline oracles, wrote, according to some, by Jews acquainted with the prophecies of the Old Testament, divide the duration of the world into ten *ages*; and according to Josephus, each age contained six hundred years. It appears, by Virgil's fourth eclogue, and other testimonies, that the age of Augustus was reputed the end of these ten *ages*, consequently as the period the world's duration.

By some, the space of time commencing from Constantine, and ending with the taking of Constantinople by the Turks, in the 15th century, is called the *middle age*; but others chuse rather to date the middle age from the division of the empire made by Theodosius at the close of the 4th century, and extend it to the time of the emperor Maximilian I. in the beginning of the 16th century, when the empire was first divided into circles.—The middle is by some denoted the *barbarous age*, and the latter part of it the *lowest age*. Some divide it into the *non-academical* and *academical ages*. The first includes the space of time from the 6th to the 9th centuries, during which schools or academies were lost in Europe. The second from the 9th century, when schools were restored, and universities established, chiefly by the care of Charlemagne.

AGE is also frequently used in the same sense with *century*, to denominate a duration of 100 years.

AGE likewise signifies a certain period of the duration of human life: by some divided into four stages, namely, infancy, youth, manhood, and old age; the first extending to the 14th year, the second to the 25th, the third to the 50th, and the fourth to the end of life: by others divided into infancy, childhood, youth, manhood, and old age *.

AGE, in law, signifies a certain period of life, when persons of both sexes are enabled to do certain acts. Thus, one at twelve years of age ought to take the oath of allegiance to the king in a lect; at fourteen he may marry, chuse his guardian, and claim his lands

held in focage. Twenty-one is called *full age*, a man or woman being then capable of acting for themselves, of managing their affairs, making contracts, disposing of their estates, and the like.

AGE-PRIER, in law, is when an action being brought against a person under age, for lands defended to him, he, by motion or petition, shews the matter to the court, praying the action may be staid till his full age; which the court generally agrees to.

AGEMA, in Macedonian antiquity, was a body of soldiery, not unlike the Roman legion.

AGEMOGLANS, AGIAMOGLANS, or AZAMOGGLANS, in the Turkish polity, are children purchased from the Tartars, or raised every third year, by way of tribute, from the Christians tolerated in the Turkish empire. These, after being circumcised and instructed in the religion and language of their tyrannical masters are learnt the exercises of war, till they are of a proper age for carrying arms; and from this corps the Janissaries are recruited. With regard to those who are thought unfit for the army, they are employed in the lowest offices of the seraglio. Their appointments also are very small, not exceeding seven aspers and a half per day, which amount to about threepence-halfpenny of our money.

AGEN, a city of France, on the river Garonne, the capital of Agenois in Guienne, and the see of a bishop. The gates and old walls, which are yet remaining, shew that this city is very ancient, and that its former circuit was not so great as the present; but there is no trace remaining of the castle so famous in history. The palace, wherein the prefidial holds his sessions at this day, was heretofore called the castle of Montravel; and is seated without the walls of the old city, and on the side of the fosse. There are likewise the ruins of another castle called *La Sagne*, which was without the walls close by a brook. Though the situation of Agen is very convenient for trade and commerce, the inhabitants are so very indolent that there is very little, of which the neighbouring cities take the advantage. It is seated on the bank of the river Garonne, in a pleasant country. E. Long. o. 30. N. Lat. 44. 12.

AGENDA, among philosophers and divines, signifies the duties which a man lies under an obligation to perform: thus, we meet with the *agenda* of a Christian, or the duties he ought to perform; in opposition to the *credenda*, or things he is to believe.

AGENDA, among merchants, a term sometimes used for a memorandum-book, in which is set down all the business to be transacted during the day, either at home or abroad.

AGENORIA, in mythology, the goddess of courage and industry, as *Vacuna* was of indolence.

AGENT, in a general sense, denotes any active power or cause. Agents are either natural or moral. Natural agents are such inanimate bodies as have a power to act upon other bodies in a certain and determinate manner; as, gravity, fire, &c. Moral agents, on the contrary, are rational creatures, capable of regulating their actions by a certain rule.

AGENT, is also used to denote a person intrusted with the management of an affair, whether belonging to a society, company, or private person.

AGER, in Roman antiquity, a certain portion of land allowed to each citizen. See AGRARIAN LAW.

AGER

* See the article *Man*; and *Moral Philosophy*, Sect. I. n^o 242.

Ager
Piceus
||
Agefilaus.

Agefilaus.

AGER PICEUS, (Cicero, Sallust, Livy) and sometimes *Picenium*, (Cæsar, Pliny) a territory of Italy to the south-east of Umbria, reaching from the Apennine to the Adriatic. The people are called *Picentes*, (Cicero, Livy), distinct from the Picentini on the Tufcan sea, though called by Greek writers *Πικεντινός*. This name is said to be from the bird *Picus*, under whose conduct they removed from the Sabines, of whom they were a colony.

AGERATUM, **BASTARD HEMP**—**AGRIMONY**; a genus of the polygamia æqualis order, belonging to the syngenesia class of plants. Of this genus there are three species; the conyzoides, the houstonianum, and the altissimum. All these are natives of warm climates. The first grows to a foot high; the stalks are round and firm; the leaves two inches long, broadest at the base, and serrated round the edges; the flowers are white, and stand on the extremities of the branches. They appear in July, and continue flowering till the frosts destroy them. The third sort is a native of Carolina, has a perennial root, and an annual stalk, which grows to the height of five or six feet, putting out side-branches at the top; the leaves are shaped like an heart. At the end of the shoots the flowers are produced in large tufts, are of a pure white, and appear in October.

Culture. The two first are annual plants, and consequently can be propagated only by seeds; which, however, come to perfection in this country. They must be sown in a hot-bed in the spring; and when the plants are come up, and strong enough to remove, they must be transplanted to another moderate hot-bed, observing to water and shade them until they have taken root; after which time they must have a good share of air in warm weather, otherwise they will grow up very weak. In summer, the plants will thrive in the open air. The seeds ripen in September and October.—The third species will bear the severest cold in this climate, but its seeds do not ripen in this country. It puts out off-sets, however, from its roots, by which it may be propagated, as well as by seeds, which are very frequently brought from America. The plants spread their roots very much, and cannot bear a cramped situation; for which reason, they must be allowed three feet every way. They delight in a rich moist soil and open situation, where they will produce so many stalks from each root as to form a considerable bush.

AGERATUM, or **MAUDLIN**. See **ACHILLEA**.

AGERATUM PURPUREUM. See **ERINUS**.

AGGA, or **AGGONNA**, a British settlement on the gold-coast of Guiney. It is situated under the meridian of London, in 6 degrees of N. lat.

AGGER, in the ancient military art, a bank or rampart, composed of various materials, as earth, boughs of trees, &c.—The agger of the ancients was of the same nature with what the moderns call *lines*.

AGGERHUYS, a city of Norway, capital of the province of the same name. It is subject to Denmark, and situated in E. long. 28. 35. and N. lat. 59. 30.

AGGERS-HERRÉD, a district of Christianland and a diocese of Norway. It consists of three juridical places; namely, Åfcher, Velt Barum, and Åger.

AGESILAUS, king of the Lacedæmonians, the son of Archidamus, was raised to the throne notwithstanding the superior claim of Leotychides. As soon

as he came to the throne, he advised the Lacedæmonians to be beforehand with the king of Persia, who was making great preparations for war, and to attack him in his own dominions. He was himself chosen for this expedition; and gained so many advantages over the enemy, that if the league which the Athenians and the Thebans formed against the Lacedæmonians had not obliged him to return home, he would have carried his victorious arms into the very heart of the Persian empire. He gave up, however, all these triumphs readily, to come to the succour of his country, which he happily relieved by his victory over the allies in Bæotia. He obtained another near Corinth; but to his great mortification, the Thebans afterward gained several over the Lacedæmonians. These misfortunes at first raised somewhat of a clamour against him. He had been sick during the first advantages which the enemy gained; but as soon as he was able to act in person, by his valour and prudence he prevented the Thebans from reaping the advantages of their victories; inasmuch that it was generally believed, had he been in health at the beginning, the Lacedæmonians would have sustained no losses, and that all would have been lost had it not been for his assistance. It cannot be denied but he loved war more than the interest of his country required; for if he could have lived in peace, he had saved the Lacedæmonians several losses, and they would not have been engaged in many enterprises which in the end contributed much to weaken their power. He died in the third year of the 104th Olympiad, being the 84th year of his age, and 41st year of his reign. Agefilaus would never suffer any picture or sculpture to be made of him, and prohibited it also by his will: this he is supposed to have done from a consciousness of his own deformity; for he was of a short stature, and lame of one foot, so that strangers used to despise him at the first sight. His fame went before him into Egypt, and there they had formed the highest idea of Agefilaus; when he landed in that country, the people ran in crowds to see him: but great was their surprise when they saw an ill-dressed, slovenly, mean-looking little fellow lying upon the grass; they could not forbear laughing, and applied to him the fable of the mountain in labour. He was, however, the first to jest upon his own person; and such was the gaiety of his temper, and the strength with which he bore the roughest exercises, that these qualities made amends for his corporal defects. He was extremely remarkable for plainness and frugality in his dress and way of living. "This (says Cornelius Nepos) is especially to be admired in Agefilaus: when very great presents were sent him by kings, governors, and states, he never brought any of them to his own house; he changed nothing of the diet, nothing of the apparel of the Lacedæmonians. He was contented with the same house in which Euristhenes, the founder of his family, had lived: and whoever entered there, could see no sign of debauchery, none of luxury; but, on the contrary, many of moderation and abstinence; for it was furnished in such a manner, that it differed in nothing from that of any poor or private person." Upon his arrival into Egypt, all kind of provisions were sent to him; but he chose only the most common, leaving the perfumes, the confections, and all that was esteemed most delicious, to his servants. Agefilaus was extremely fond of his children, and would often amuse himself by joining

Agēpolis

Agio.

joining in their diversions: one day when he was surprized riding upon a stick with them, he said to the person who had seen him in this posture, "Forbear talking of it till you are a father."

AGESIPOLIS I. king of Lacedæmon, succeeded his father Pausanias, colleague of Agēfilas II. He ravaged the country of Mantinea, subdued that city, and pillaged Olynthia. He died about 380 years before Jesus Christ, and was embalmed in honey, according to the custom of the Lacedæmonians. He died without issue, and was succeeded by Cleombrotus his brother, the father of Agēpolis II. who was more remarkable for his apophthegms than his actions.

AGGLUTINANTS, in pharmacy, a general name for all medicines of a glutinous or viscid nature; which, by adhering to the solids, contribute greatly to repair their lofs.

AGGLUTINATION, in a general sense, denotes the joining two or more things together, by means of a proper glue or cement.

AGGLUTINATION, among physicians, implies the action of reuniting the parts of a body, separated by a wound, cut, &c. It is also applied to the action of such internal medicines as are of an agglutinating quality, and which, by giving a glutinous consistence to the animal-fluids, render them more proper for nourishing the body.

AGGRAVATION, a term used to denote whatever heightens a crime, or renders it more black.

AGGREGATE, in a general sense, denotes the sum of several things added together, or the collection of them into one whole. Thus, a house is an aggregate of stones, wood, mortar, &c. It differs from a mixed or compound, inasmuch as the union in these last is more intimate than between the parts of an aggregate.

AGGRESSOR, among lawyers, denotes the person who began a quarrel, or made the first assault.

AGHER, a town of Ireland, which sends two members to parliament. It is situated in the southern part of Ulster, not far from Clogher.

AGHRIM, a town of Ireland, in the county of Wicklow, and province of Leinster, situated about thirteen miles south-west of Wicklow.

AGIADES, in the Turkish armies, a kind of pioneers employed in fortifying camps, smoothing of roads, and the like offices.

AGILITY, an aptitude of the several parts of the body to motion; or it may be defined, The art or talent of making the best use of our strength.—The improving of agility was one of the chief objects of the institution of games and exercises. The athlete made particular profession of the science of cultivating and improving agility. Agility of body is often supposed peculiar to some people; yet it seems not owing to any thing in their frame and structure different from others, but entirely to practice.

AGINCOURT, a village of the French Netherlands; famous on account of the victory obtained by Henry V. of England over the French, in 1415. E. long. 2. 10. N. lat. 50. 35.

AGIO, in commerce, is a term chiefly used in Holland, and at Venice, to signify the difference between the value of bank-stock and the current coin. The agio in Holland is generally three or four *per cent.* and at Rome it is from 15 to 25 *per cent.* but at Venice

the agio is fixed at 20 *per cent.*

AGIOSYMANDRUM, a wooden instrument used by the Greek and other churches under the dominion of the Turks, to call together assemblies of the people. The *agiosymandrum* was introduced in the place of bells, which the Turks prohibited their Christian subjects the use of, lest they should make them subservient to sedition.

AGISTMENT, **AGISTAGE**, or **AGISTATION**, in law, the taking in other people's cattle to graze at so much *per week*. The term is peculiarly used for the taking cattle to feed in the king's forests, as well as for the profits arising from that practice.—It is also used, in a metaphorical sense, for any tax, burden, or charge; thus, the tax levied for repairing the banks of Romney-marsh was called *agistmentum*.

AGISTOR, or **AGISTATOR**, an officer belonging to forests, who has the care of cattle taken in to be grazed, and levies the moneys due on that account. They are generally called *quest-takers* or *gift-takers*, and are created by letters-patent. Each royal forest has four agistors.

AGISYMBIA, (anc. geogr.) a district of Libya Interior, according to Agathemerus, situated to the south-east of the Æthiopes Anthropophagi; the parallel passing through which, at 16° to the south of the equator, was the utmost extent of the knowledge of the ancients to the south, (Ptolemy.)

AGITATION, the act of shaking a body, or tossing it backwards and forwards.

AGITATION, in physics, is often used for an intestine commotion of the parts of a natural body. Fermentation and effervescence are attended with a brisk agitation of the particles.

AGITATION is one of the chief causes or instruments of mixture: by the agitation of the parts of the blood and chyle, in their continual circulation, sanguification is in a good measure effected. Butter is made out of milk by the same means: in which operation, a separation is made of the oleous parts from the serous, and a conjunction of the oleous together. Digestion itself is only supposed to be an insensible kind of agitation.

AGITATION is reputed one of the symptoms of inspiration. Petit informs us†, that, in the last century, there arose in a church in Italy, for the space of a year, a vapour of an extraordinary kind, which put all the people into trembling and agitations, and unless they got away betimes, lest them a dancing, with strange contortions and gesticulations. This seems to verify what has been related of the temple of Delphi.

AGITATION is also used in medicine, for a species of exercise popularly called *swinging*. Maurice prince of Orange found this method a relief against the severe pains of the gout and stone. Bartholine mentions fits of the tooth-ach, deafness, &c. removed by vehement agitations of the body.

AGITATOR, in antiquity, a term sometimes used for a charioteer, especially those who drove in the circus at the curule games.

AGITATORS, in the English history, certain officers set up by the army in 1647, to take care of its interests.—Cromwell joined the agitators, only with a view to serve his own ends; which being once accomplished, he found means to get them abolished.

AGLIONBY (John) an English divine, chaplain

in

Agiofy-

mandrum

||

Aglionby.

† Petit de Sybilla, l. i. Nouv. Rep. Lett. tom. viii. p. 1113.

Agmen
|
Agnus. In ordinary to king James I. a man of universal learning, who had a very considerable hand in the translation of the New Testament appointed by king James I. in 1604.

AGMEN, in antiquity, properly denotes a Roman army in march: in which sense, it stands contradistinguished from *acies*, which denoted the army in battle array; though, on some occasions, we find the two words used indifferently for each other. The Roman armies, in their marches, were divided into *primum agmen*, answering to our vanguard; *medium agmen*, our main-battle; and *postremum agmen*, the rear-guard. The order of their march was thus: After the first signal with the trumpets, &c. the tents were taken down, and the baggage packed up; at the second signal, the baggage was to be loaded on the horses and carriages; and at the third signal, they were to begin their march. First came the *extraordinarii*; then the auxiliaries of the first wing, with their baggage; these were followed by the legions. The cavalry marched either on each side, or behind.

AGNATE, in law, any male relation by the father's side.

AGNO, a river of Naples, which, taking its rise in the mountainous parts of Terra di Lavoro, washes the town of Acerra; and, passing between Capua and Aversa, falls into the Mediterranean, about seven miles north of Puzzuoli.

AGNOETÆ, (from *αἰσῆς*, to be ignorant of), in church-history, a sect of ancient heretics, who maintained that Christ, considered as to his human nature, was ignorant of certain things, and particularly of the time of the day of judgment. Eulogius, patriarch of Alexandria, ascribes this heresy to certain solitaries in the neighbourhood of Jerusalem, who built their opinion upon the text Mark xiii. 32. "Of that day and hour knoweth no man, no not the angels who are in heaven, neither the Son, but the Father only."—The same passage was made use of by the Arians; and hence the orthodox divines of those days were induced to give various explications thereof. Some allege, that our Saviour here had no regard to his divine nature, but only spoke of his human. Others understand it thus, That the knowledge of the day of judgment does not concern our Saviour considered in his quality of Messiah, but God only: which is the most natural solution.

AGNOMEN, in Roman antiquity, a kind of fourth or honorary name, given to a person on account of some extraordinary action, virtue, or other accomplishment. Thus, the agnomen *Africanus* was bestowed upon Publius Cornelius Scipio, on account of his great achievements in Africa.—The agnomen was the third in order of the three Roman names: thus, in Marcus Tullius Cicero, Marcus is the prænomen, Tullius the nomen, and Cicero the agnomen.

AGNON, a small river of Bourgogne in France, otherwise called *Ignon*.

AGNONE, a city of the kingdom of Naples, in the province of the Hither Abruzzo, called by some *Ancone*.

AGNUS, or LAMB, in zoology, the young of the ovivora or sheep. See *Ovis*.

AGNUS Castus, in botany, the trival name of a species of the vitex *. The Greeks call it *αἰσῆς*, chaste; to which has since been added the reduplicative *castus*, *g. d.* chaste chaste. It was famous among the ancients

as a specific for the preservation of chastity. The Athenian ladies, who made profession of chastity, lay upon leaves of *agnus castus* during the feasts of Ceres.—Being reputed a cooler, and particularly of the genital parts, it was anciently used in physic to allay those inordinate motions arising from femal turgecences: but it is out of the present practice.

AGNUS Dei, in the church of Rome, a cake of wax stamped with the figure of a lamb supporting a cross. These being consecrated by the pope with great solemnity, and distributed among the people, are supposed to have great virtues; as, to preserve those who carry them worthily, and with faith, from all manner of accidents; to expel evil spirits, &c.—It is also a popular name for that part of the mass, where the priest strikes his breast thrice, and says the prayer beginning with the words *Agnus Dei*.

AGNUS Strythicus. See *Strythian* LAMB.

AGOGE, among ancient musicians, a species of modulation, wherein the notes proceed by contiguous degrees.

AGON, among the ancients, implied any dispute or contest, whether it had regard to bodily exercises, or the accomplishments of the mind; and therefore poets, musicians, painters, &c. had their agones, as well as the athletes. Games of this kind were celebrated at most of the heathen festivals, with great solemnity, either annually, or at certain periods of years. Among the latter were celebrated at Athens, the *agon gymnicus*, the *agon nemus* instituted by the Argives in the 53^d Olympiad, and the *agon Olympius* instituted by Hercules 430 years before the first Olympiad. The Romans also, in imitation of the Greeks, instituted contests of this kind. The emperor Aurelian established one under the name of *agon solis*, the contest of the sun; Dioclesian another, which he called *agon capitolinus*, which was celebrated every fourth year, after the manner of the Olympic games. Hence the years, instead of *lustris*, are sometimes numbered by *agones*.

AGON also signified one of the ministers employed in the heathen sacrifices, and whose business it was to strike the victim. The name is supposed to have been derived from hence, that standing ready to give the stroke he asked *Agon?* or *Agone?* shall I strike?

AGONALES, an epithet given to the *SALII*.

AGONALIA, in Roman antiquity, festivals celebrated in honour of Janus; or of the god Agonius, whom the Romans invoked before undertaking any affair of importance.

AGONISMA, in antiquity, denotes the prize given to the victor in any combat or dispute.

AGONISTIC, in church-history, a name given by Donatus to such of his disciples as he sent to fairs, markets, and other public places, to propagate his doctrine; for which reason they were also called *Circuitoires*, *Circelliones*, *Catropite*, *Coropite*, and at Rome *Montenses*. They were called *Agonistici*, from the Greek *αἰσῆς*, combat; in regard they were sent, as it were, to fight, and subdue the people to their opinions.

AGONISTICON, a term used by physicians for cold water, as being supposed to combat the febrile heat.

AGONIUM, in Roman antiquity, was used for the day on which the *rex sacrorum* sacrificed a victim, as well as for the place where the games were celebrated otherwise called *agon*.

AGONOTHETA, or AGONOTHETES, in Grecian antiquity,

Agnus
|
Agonotheta.

* See *Vitex*.
Vol. I.

Agony
||
Agricola.

antiquity, was the president or superintendent of the sacred games; who not only defrayed the expences attending them, but inspected the manners and discipline of the athletes, and adjudged the prizes to the victors.

AGONY, any extreme pain. It is also used for the pangs of death. Much of the terror of death consists in the pangs and convulsions wherewith the agony seems attended; tho' we have reason to believe, that the pain in such cases is ordinarily not extremely acute; a course of pain and sickness having usually stupified and indisposed the nerves for any quick sensations. However, various means have been thought of for mitigating the agony of death. Lord Bacon considers this as part of the province of a physician; and that not only when such a mitigation may tend to a recovery, but also when, there being no further hopes of a recovery, it can only tend to make the passage out of life more calm and easy. Complacency in death, which Augustus so much desired, is certainly no small part of happiness. Accordingly the author last cited ranks *enthusiasm*, or the art of dying easily, among the desiderata of science; and does not even seem to disapprove of the course Epicurus took for that end,

—*Hinc Pygias ebrius haust aquas.*

Opium has been applied for this purpose, with the applause of some, but the condemnation of more.

AGONYCLITE, or **AGONYCLITES**, in church-history, a sect of Christians, in the 7th century, who prayed always standing, as thinking it unlawful to kneel.

AGORÆUS, in heathen antiquity, an appellation given to such deities as had statues in the market-places; particularly Mercury, whose statue was to be seen in almost every public place.

AGORANOMUS, in Grecian antiquity, a magistrate of Athens, who had the regulation of weights and measures, the prices of provisions, &c.

AGOUTI, or **AGUTI**. See **MUS**.

AGRA, the capital town of a province of the same name, in Indostan, and in the dominions of the Great Mogul. It is looked upon as the largest city in these parts, and is in the form of a half-moon. A man on horseback can hardly ride round it in a day. It is surrounded with a wall of red stone, and with a ditch 100 feet wide. The Great Mogul sometimes resides here: his palace is prodigiously large, and the seraglio commonly contains above 1000 women. There are upwards of 800 baths in this town; but that which travellers most admire, is the mausoleum of one of the Mogul's wives, which was 20 years in building. The indigo of Agra is the most valuable of all that comes from the East-Indies. It is seated on the river Jemma, about 50 miles above its confluence with the Tehemel, and is 300 miles N. E. of Surat. E. Long. 79. 12. N. Lat. 26. 29.

AGRARIAN laws, among the Romans, those relating to the division and distribution of lands; of which there were a great number; but that called the *Agrian Law*, by way of eminence, was published by Spurius Cassius, about the year of Rome 268, for dividing the conquered lands equally among all the citizens, and limiting the number of acres which each citizen might enjoy.

AGREDA, a town of Spain, in Old Castile, near the frontiers of Arragon, and about three leagues south-west of Tarazon.

AGREEMENT, in law, signifies the consent of several persons to any thing done or to be done.

AGRESTÆ, among physicians, denotes unripe grapes, said to be of a cooling nature.

AGRI, or **ACRI**, a river of the kingdom of Naples, which arising in the Apennine mountains, not far from Marisco Nuovo, falls into the gulph of Tarento.

AGRIA, called by the Germans *Eger*, is a small but strong town in Upper Hungary, and is a bishop's see. It is situated on a river of the same name, and has a citadel called Erlaw. It was besieged by the Turks in 1552, with 70,000 men: but they lost 8000 in one day; and were obliged to raise the siege, though the garrison consisted only of 2000 Hungarians, assisted by the women, who performed wonders on this occasion. However, it was afterwards taken by Mahomet III. in 1596; but was re-taken by the emperor in 1687, since which time it has continued under the dominion of the house of Austria. It is 47 miles north-east of Buda, and 55 south-west of Cassovia. E. Long. 20. 10. N. Lat. 48. 10.

AGRICOLA (Cneus Junius), born at Frejus in Provence, was made lieutenant in Vespasian's time to Vettius Bolanus in Britain; and, upon his return, was ranked by that emperor among the patricians, and made governor of Aquitania. This post he held three years; and upon his return was chosen consul, and afterward appointed governor of Britain, where he greatly distinguished himself. He reformed many abuses occasioned by the avarice or negligence of former governors; put a stop to extortion; and caused justice to be impartially administered. Vespasian dying about this time, his son Titus, knowing the great merit of Agricola, continued him in the government. In the spring, he marched towards the north, where he made some new conquests, and ordered forts to be built for the Romans to winter in. He spent the following winter in concerting schemes to reduce the Britons to conform to the Roman customs: he thought the best way of diverting them from rising and taking arms, was to soften their rough manners, by proposing to them new kinds of pleasure, and inspiring them with a desire of imitating the Roman manners. Soon after this, the country was adorned with magnificent temples, porticos, baths, and many other fine buildings. The British nobles had at length their sons educated in learning; and they who before had the utmost aversion to the Roman language, now began to study it with great assiduity: they wore likewise the Roman habit; and, as Tacitus observes, they were brought to consider those things as marks of politeness, which were only so many badges of slavery. Agricola, in his third campaign, advanced as far as the Tweed; and in his fourth, he subdued the nations betwixt the Tweed and the friths of Edinburgh and Dumbritton, into which the rivers Glotta and Bodotria discharge themselves; and here he built fortresses to shut up the nations yet unconquered. In his fifth, he marched beyond the friths; where he made some new acquisitions, and fixed garrisons along the western coasts, over against Ireland. In his sixth campaign he passed the river Bodotria, ordering his fleet, the first which the Romans ever had in those parts, to row along the coasts, and take a view of the northern parts. In the following spring, the Britons raised an army of 30,000 men; and the command was

Agreement
||
Agricola.

given

Agricola.

given to Galgacus, who, according to Tacitus, made an excellent speech to his countrymen on this occasion. Agricola likewise addressed his men in very strong and eloquent terms. The Romans gained the victory, and 10,000 of the Britons are said to have been killed. This happened in the reign of the emperor Domitian; who, growing jealous of the glory of Agricola, recalled him, under pretence of making him governor of Syria. Agricola died soon after, and his death is suspected to have been occasioned by poison given him by that emperor. Tacitus the historian married his daughter, wrote his life, and laments his death in the most pathetic manner.

AGRICOLA (George), a German physician, famous for his skill in metals. He was born at Glaucha, in Misnia, the 24th of March 1494. The discoveries which he made in the mountains of Bohemia gave him so great a desire of examining accurately into every thing relating to metals, that though he had engaged in the practice of physic at Joachimsthal by advice of his friends, he still prosecuted his study of fossils with great assiduity; and at length removed to Chemnitz, where he entirely devoted himself to this study. He spent in pursuit of it the pension he had of Maurice duke of Saxony, and part of his own estate; so that he reaped more reputation than profit from his labours. He wrote several pieces upon this and other subjects; and died at Chemnitz the 21st of November, 1555, a very firm Papist. In his younger years he seemed not averse to the Protestant doctrine; and he highly disapproved of the scandalous traffic of indulgences, and several other things in the church of Rome. The following lines of his were posted up in

the streets of Zwickaw, in the year 1519:

*Si nos infelix saluabit cistula nummo,
Hec nimium infelix tu mihi, pauper, eris!
Si nos, Christe, tua servatus morte beasti,
Tam mihi infelix tu mihi, pauper, eris.
If wealth alone salvation can procure,
How sad a fate for ever waits the poor!
But if thou, Christ, our only saviour be,
Thy merits still may bless ev'n poverty!*

In the latter part of his life, however, he had attacked the Protestant religion; which rendered him so odious to the Lutherans, that they suffered his body to remain unburied for five days together; so that it was obliged to be removed from Chemnitz to Zeitz, where it was interred in the principal church.

AGRICOLA (John), a Saxon divine born at Islebe in 1492. He went as chaplain to count Mansfield, when that nobleman attended the Elector of Saxony to the diet of Spire in 1526, and that of Augsburg in 1530. He was of a restless ambitious temper, rivalled and wrote against Melancthon, and gave count Mansfield occasion to reproach him severely. He obtained a professorship at Wittemberg, where he taught particular doctrines, and became founder of the sect of Antinomians; which occasioned warm disputes between him and Luther, who had before been his very good friend. But though he was never able to recover the favour either of the elector of Saxony, or of Luther, he received some consolation from the fame he acquired at Berlin: where he became preacher at court; and was chosen in 1548, in conjunction with Julius Pflug, and Michael Heldingus, to compose the famous *Interim*, which made so much noise in the world.* He died at Berlin in 1566.

A G R I C U L T U R E

Definition. **MAY** be defined, The art of disposing the earth in such a manner as to produce whatever vegetables we desire, in large quantity, and in the greatest perfection of which their natures are capable.—But though, by this definition, agriculture, strictly speaking, includes in it the cultivation of every species of vegetable whatever, and consequently comprehends all that is understood of gardening and planting, we mean here to confine ourselves to the cultivation of those species of grain, grass, &c. which, in this country, are generally necessary as food for men and beasts.

HISTORY. **THAT** the antiquity of this art is beyond all others, cannot well be doubted; seeing we are informed by Scripture, that Adam was sent from the garden of Eden *to till the ground*; and, this being the case, he certainly must have known how to do so.—It would be ridiculous, from this, to imagine that he was acquainted with all the methods of ploughing, harrowing, fallowing, &c. which are now made use of; and it would be equally foolish to imagine, that he used such clumsy and unartful instruments as wooden hooks, horns of oxen, &c. to dig the ground, which were afterwards employed for this purpose by certain savages: but as we know nothing of the particular circumstances in which he was situated, we can know as little concerning his method of agriculture.

The prodigious length of life which the antedilu-

vians enjoyed, must have been very favourable to the advancement of arts and sciences, especially agriculture, to which they behaved to apply themselves in a particular manner, in order to procure their subsistence. It is probable, therefore, that, even in the antediluvian world, arts and sciences had made great progress, nay, might be farther advanced in some things than they are at present. Of this, however, we can form no judgment, as there are no histories of those times, and the scripture gives us but very slight hints concerning these matters.

No doubt, by the terrible catastrophe of the flood, which overwhelmed the whole world, many sciences would be entirely lost, and agriculture would suffer; as it was impossible that Noah or his children could put in practice, or perhaps, know, all the different methods of cultivating the ground that were formerly used. The common methods, however, we cannot but suppose to have been known to him and his children, and by them transmitted to their posterity; so that as long as mankind continued in one body without being dispersed into different nations, the arts, agriculture especially, behaved to advance; and that they did so is evident from the undertaking of the tower of Babel. It is from the dispersion of mankind consequent upon the confusion of tongues, that we must date the origin of savage nations. In all societies where different arts are cultivated, there are some persons who have a kind of general

Agricola.

ral knowledge of most of those practised through the whole society, while others are in a manner ignorant of every one of them. If we suppose a few people of understanding to separate from the rest, and become the founders of a nation, it will probably be a civilized one, and the arts will begin to flourish from its very origin; but, if a nation is founded by others whose intellects are in a manner callous to every human science, (and of this kind there are many in the most learned countries), the little knowledge or memory of arts that were among the original founders will be lost, and such nations will for many ages be a savage and degenerate race, till at last they will either begin to improve of themselves, or the arts will be brought to them from other nations.

From this, or similar causes, all nations of equal antiquity have not been equally savage, nor is there any solid reason for concluding that all nations were originally unskilled in agriculture; though as we know not the original instruments of husbandry used by mankind when living in one society, we cannot fix the date of the improvements in this art. Different nations have always been in a different state of civilization; and agriculture, as well as other arts, has always been in different degrees of improvement among different nations at the same time.

From the earliest accounts of the eastern nations, we have reason to think, that agriculture has at all times been understood by them in considerable perfection; seeing they were always supplied not only with the necessities, but the greatest luxuries, of life. The Egyptians never appear to have been destitute of it, seeing they were capable of supplying other nations with corn upwards of 2400 years before the Christian era. The accounts of Herodotus, concerning the judicious conduct of this nation in the disposition of their country with respect to the inundations of the Nile, likewise evince their knowledge of agriculture to have been very considerable.

The Greeks, who were at first a set of barbarous savages, appear to have received their knowledge of agriculture from the eastern nations. Some few fragments of theirs are the most ancient rudiments of husbandry upon record. The elder Cato is the most ancient Latin author whose writings upon this subject have reached the present time. An improved treatise on agriculture was written by Varro, who has embellished his subject with elegant language: soon after him, Virgil published his justly admired Georgics, by far the most laboured and highly finished of any of his works. Columella afterwards collected with great judgment whatever was valuable in the writings of his predecessors, and enriched them with his own observations on the subject. His work is one of the choicest remains of antiquity, and has scarcely been equalled by any author since his time.—Valuable treatises on agriculture were also published by Attalus, king of Pergamus; Archelaus, king of Cappadocia; Valerius Asiaticus, who was judged worthy of the empire after Caligula; and by the emperor Albinus.

The irruptions of the barbarous nations of the north soon abolished any improved agriculture. These innumerable and enterprising barbarians, who over-ran all Europe, were originally shepherds or hunters, like the present Tartars and the savages of America. They con-

tented themselves with possessing those vast deserts made by their own ravages, without labour or trouble, cultivating only a very small spot near their habitations; and in this trifling husbandry, only the meanest slaves were employed: so that the art itself, which formerly was thought worthy of the study of kings, was now looked upon as mean and ignoble; a prejudice which is scarcely effaced at present, or at least but very lately.

At what time agriculture was introduced into Britain, is uncertain. When Julius Cæsar first invaded this island, it was not wholly unknown. That conqueror was of opinion, that agriculture was first introduced by some of those colonies from Gaul which had settled in the southern parts of Britain, about 100 years before the Roman invasion*.

It is not to be expected that we can now be acquainted with many of the practices of these ancient husbandmen. It appears, however, that they were not unacquainted with the use of manures, particularly marle. This we have on the authority of Pliny†, who tells us, that it was peculiar to the people of Gaul and of Britain; that its effects continued 80 years; and that no man was ever known to marle his field twice, &c.—It is highly probable, too, that lime was at this time also used as a manure in Britain, it being certainly made use of in Gaul for this purpose at the time of Julius Cæsar's invasion.

The establishment of the Romans in Britain produced great improvements in agriculture, inasmuch that prodigious quantities of corn were annually exported from the island; but when the Roman power began to decline, this, like all the other arts, declined also, and was almost totally destroyed by the departure of that people. The unhappy Britons were now exposed to frequent incursions of the Scots and Picts, who destroyed the fruits of their labours, and interrupted them in the exercise of their art. After the arrival of the Saxons in the year 449, they were involved in such long wars, and underwent so many calamities, that the husbandmen gradually lost much of their skill, and were at last driven from those parts of their country which were most proper for cultivation.

After the Britons retired into Wales, though it appears from the laws made relative to this art, that agriculture was thought worthy of the attention of the legislature, yet their instruments appear to have been very unartful. It was enacted that no man should undertake to guide a plough who could not make one; and that the driver should make the ropes of twisted willows, with which it was drawn. It was usual for six or eight persons to form themselves into a society for fitting out one of these ploughs, providing it with oxen and every thing necessary for ploughing; and many minute and curious laws were made for the regulation of such societies. If any person laid dung on a field with the consent of the proprietor, he was by law allowed the use of that land for one year. If the dung was carried out in a cart in great abundance, he was to have the use of the land for three years. Whoever cut down a wood, and converted the ground into arable, with the consent of the owner, was to have the use of it for five years. If any one folded his cattle, for one year, upon a piece of ground belonging to another, with the owner's consent, he was allowed the use of that field for four years.

* Cæsar de Bell. Gal. lib. 5. c. 12.

† Plin. Nat. Hist. lib. 17. cap. 6.

Thus, though the Britons had in a great measure lost the knowledge of agriculture, they appear to have been very assiduous in giving encouragement to such as would attempt a revival of it; but, among the Anglo-Saxons, things were not at present in so good a state. These restless and haughty warriors, having contracted a distaste and contempt for agriculture, were at pains to enact laws to prevent its being followed by any other than women and slaves. When they first arrived in Britain, they had no occasion for this art, being supplied by the natives with all the necessities of life. After the commencement of hostilities, the Saxons subsisted chiefly by plunder; but having driven out or extirpated most of the ancient Britons, and divided their lands among themselves, they found themselves in danger of starving, there being now no enemy to plunder; and therefore they were obliged to apply to agriculture.

The Saxon princes and great men, who, in the division of the lands, had received the greatest shares, are said to have subdivided their estates into two parts, which were called the *in-lands* and the *out-lands*. The in-lands were those which lay most contiguous to the mansion-house of their owner, which he kept in his own possession, and cultivated by his slaves, under the direction of a bailiff, for the purpose of raising provisions for the family. The out-lands were those at a greater distance from the house, and were let to the *eorls*, or farmers of those times, at very moderate rents. By the laws of Ina king of the west Saxons, who reigned in the end of the seventh and beginning of the eighth century, a farm, consisting of ten hides, or plough-lands, was to pay the following rent: "Ten calks of honey; three hundred loaves of bread; twelve calks of strong ale; thirty calks of small ale; two oxen; ten wedders; ten geese; twenty hens; ten cheefes; one cask of butter; five salmon; twenty pounds of forage; and one hundred eels." From this low rent the imperfection of agriculture at that time is easily discoverable; but it is still more so from the low prices at which land was then sold. In the ancient history of the church of Ely, published by Dr Gale, there are accounts of many purchases of lands by *Ædelwold* the founder of that church, and by other benefactors, in the reign of *Edgar the Peaceable*, in the tenth century. By a comparison of these accounts it appears, that the ordinary price of an acre of the best land in that part of England, in those times, was no more than 76 Saxon pennies, or about four shillings of our money; a very trifling price, even in comparison of that of other commodities at the same time: for, by comparing other accounts, it appears, that four sheep were then equal in value to an acre of the best land, and one horse of the same value with three acres. The frequent and deplorable famines which afflicted England about this time, are further instances of the wretched state of agriculture. In 1043, a quarter of wheat sold for 60 Saxon pennies, (15 of our shillings) and at that time equal in value to seven or eight pounds of our money now.

The invasion of the Normans, in 1066, contributed very much to the improvement of agriculture; for, by that event, many thousands of husbandmen from Flanders, France, and Normandy, settled in Britain, ob-

tained estates or farms, and cultivated them after the manner of their country. The implements of husbandry, used at this time, were of the same kind with those employed at present; but some of them were less perfect in their construction. The plough, for example, had but one stilt, or handle, which the ploughman guided with one hand, leaving in his other hand an instrument which served both for cleaning and mending the plough, as well as for breaking the clods. The Norman plough had two wheels; and in the light soil of Normandy was commonly drawn by one or two oxen; but, in England, a greater number was often necessary. In Wales, the person who conducted the oxen in the plough walked backwards. Their carts, harrows, scythes, sickles, and flails, from the figures of them still remaining, appear to have been nearly of the same construction with those that are now used. In Wales, they did not use a sickle for reaping their corns, but an instrument like the blade of a knife, with a wooden handle at each end.—Their chief manure, next to dung, seems still to have been marle. Summer fallowing of lands designed for wheat, and ploughing them several times, appear to have been frequent practices of the English farmers in this period.

All this time, agriculture seems to have been in a very imperfect state in Scotland. Though we are certain that the knowledge of it in this country proceeded originally from England, we know not when it was introduced. In 1214, the legislature seem to have directed their attention towards the improvement of this art; for by an act of Alexander II. dated this year, all farmers that had four oxen or cows, or upwards, were commanded to till their land by *ploughing*, and to begin to till fifteen days before Candlemas; that such farmers as had not so many oxen, should delve with hand and foot as much land as would produce a sufficient quantity of corn to support themselves and their families. It is probable, however, that this law was designed for the Highlands, and most uncultivated parts of the kingdom; for, in the same parliament, a very severe law was made against those farmers who did not extirpate a pernicious weed called *guilde* out of their lands, which seems to indicate a more advanced state of cultivation.

The most considerable improvements in agriculture, however, have taken place in Britain since the reign of Queen Elizabeth. The reformation was no less favourable to the arts than to religion. Improvements were first begun by some natives of Switzerland who settled in England; and the liberal spirit of inquiry succeeding this remarkable period, hath in a manner entirely put an end to that slavish attachment to the customs of preceding ages, which, under the dominion of popery, proved an unformountable bar to the progress of every science. Societies for the improvement of this most useful art have been instituted both in England and Scotland; and though the agriculture of Scotland hath hitherto scarcely equalled that of England, yet the improvements that are daily making in the former, and the universal increase of the knowledge of the art among her inhabitants, leave no room to doubt, that in a few years she will show every mark of equality that soil, climate, and other natural differences, will allow.

PART I. THEORY OF AGRICULTURE.

IN an art so extensively useful to mankind, and which has been so universally practised since the creation of the world, it is natural to expect the most exact and perfect theory; but in this we are not only totally disappointed, but likewise find the greatest disagreement among those who practise it, new schemes starting up and receiving the highest applause to day, and sinking into total neglect and oblivion to-morrow.

⁷ Ignorance of the food of vegetables, therefore, is the reason of imperfection in the theory of agriculture.

One reason of this want of a distinct theory of agriculture is, the ignorance of what is properly the food of vegetables; for as the whole art of agriculture consists only in supplying them with a proper quantity of food, in the most favourable circumstances, it is evident, we could proceed upon a much more sure foundation if we could ascertain what their proper nourishment is, than we can do without this knowledge. —The reason of the great differences regarding the practice, probably, is the difficulty of making experiments in agriculture. It is not in this art as in Mechanics, Chemistry, &c. where an experiment can be made in an hour, or a day or two at farthest: an experiment in agriculture cannot be properly made in less than several years. Some favourable unobscured circumstances, quite foreign to the experiment itself, may concur to produce plentiful crops for a year or two; and thus the farmer may be induced to publish his fancied improvements, which failing in the hands of others, or perhaps even in his own on a repetition of the experiment, the new improvements are totally neglected, and things continue in their old way. Was he, however, capable of seeing and handling the food of vegetables, as well as he can do that of a horse or an ox, and procuring it in any imaginable quantity, it is plain, that he would be able to cause vegetables grow in their utmost luxuriance, or, if we may be allowed the expression, *fatten* them, with as great certainty as he can fatten a horse or an ox, when he hath plenty of proper food to give them. —To ascertain what this food is, therefore, must be a step towards the perfection of agriculture; and to this we shall contribute our endeavour.

SECT. I. *Of the proper Food of Plants.*

³ Various suppositions concerning the food of plants.

We shall not here spend time in refuting the theories of those who imagined the vegetable food to consist of oily and saline substances. These will be considered when speaking of the different kinds of manures. The theory which seems to gain most credit at present is, that Water and Air are the proper vegetable food, to which alone they owe their increase in bulk and weight. —That plants cannot be supported without both these, is very certain: but we know, that air is a compound fluid; and water is never without some impurities, so may also be considered as a compound. —Dr Priestley hath shewn, that our atmosphere is composed of earth, of phlogiston, and the nitrous acid *. To these we may add water; for whether that is an ingredient in the Doctor's pure dephlogisticated air or not, we are very sure that it is so in that air which has access to all vegetables, and contributes so much to their growth. Is it then the aqueous, the earthy, the acid, or the phlogistic part of the air, which nourishes plants? In like manner, is it

the pure elementary part of water, which nourishes them? or does it contribute to their growth only by the heterogeneous substances which it contains?

From Dr Priestley's experiments on different kinds of air, it appears that the purest kind of that fluid is not the fittest for the purposes of vegetation. On the contrary, vegetables flourished in a surprising degree when confined in a small quantity of air made perfectly noxious by the putrid effluvia of animal bodies. In these circumstances, a sprig of mint extended itself, in seven days, three inches in length, and put forth several new shoots; the putrid air, in the mean time, being deprived of its noxious quality, and becoming so wholesome that animals might breathe it with safety. This property of absorbing such noxious effluvia, he found to belong not only to mint, but indiscriminately to every vegetable substance; and hence he concludes, that one use of the vegetable creation is to purify the air from that immense quantity of putrid effluvia which is continually absorbed by it from the breath of living creatures, and the putrefaction of animal and vegetable bodies. By the absorption of these effluvia from the air we find that vegetables are remarkably increased in bulk. We are assured, therefore, that they constitute at least one species of vegetable food; and when vegetables are put into such circumstances that the steams of putrefying bodies can have access to them, we are sure they will thrive the better.

Besides this method of restoring the salubrity of putrid air by growing vegetables, the Doctor found another; namely, by agitating it in water, part of which was exposed to the atmosphere. In this case, the water acquired a very putrid noxious smell; which shews, that water, as well as air, is capable of absorbing those effluvia which are found proper food for vegetables. We cannot help concluding, therefore, that in the continual ascent of water in vapour, and its descent again in rain, which is a much more effectual agitation than could be made by Dr Priestley, the water must be very intimately combined with the phlogistic or putrid effluvia which are contained in the air. To this union we are led strongly to suspect that rain-water owes its fertilizing qualities; for the purest spring waters, though most wholesome for animals, are not found to be fittest for promoting the growth of vegetables. —As, therefore, vegetables evidently receive nourishment both by their leaves and roots, and increase remarkably in bulk by absorbing the putrid effluvia from the air; and as they likewise increase in bulk by admitting water to their roots, and more so when the water contains much of that kind of effluvia, than when it contains less; we must necessarily conclude, that the nourishment received by the roots of plants is of the same kind with that received by their leaves; and that this food may be given them in greater plenty, than they naturally receive it, by impregnating the air which surrounds them, or the water which moistens them, with a greater quantity of putrid matter than what they contain in a natural state.

Some will perhaps laugh at this scanty provision we are making for the immense quantity of vegetables with which the whole surface of the earth is covered; for

³ Vegetables, thrive in putrid air.

⁴ Water capable of imbibing putrid effluvia.

⁵ Putrid effluvia the proper food of plants.

⁶ Objections are making for the immense quantity of vegetables with which the whole surface of the earth is covered; for

the

* See Air.

THEORY. the food we have just now assigned them is naturally *invisible*, and consequently will be looked upon by many as a kind of non-entity. Its invisibility, how ever, is no argument for its existing only in a small quantity; for the subtil matter which increases the weight of calcined metals is equally invisible with what we have just now assigned for the support of the vegetable creation; nevertheless, it is so far from being in small quantity, that any imaginable weight of it may be absorbed from the air in a short time. It is said by some, that lead, by being converted into the substance called *minium* or *red lead*, gains one fourth, by others only one tenth, in weight from the air*: as a medium, we shall suppose that it gains $\frac{1}{4}$ th. If seven tons of lead, then, were converted into minium at once, it would gain one ton, or 2000lb. from the air, in three or four days at most, for that is the longest time required for the calcination. We should be surprised at finding a vegetable increase so much in such a short time, though it receives food both from the air and earth; but if the air contains such a quantity of mineral food, if we please to call it so, why should it not contain an equal quantity of matter for the support of vegetables also, even supposing them to have no other source of nourishment?

* See Chemistry, n^o 402.

SECT. II. *The foregoing Theory confirmed from considerations on the nature of vegetable Mould, and the different kinds of Manure found proper for fertilizing the Soil.*

⁷ All kinds of earth not equally proper for nourishing vegetables.

THOUGH plants will grow on any kind of earth, and flourish vigorously, if plentifully supplied with water; yet some kinds of soils are found much more proper for supplying them with nourishment than others.—We cannot, indeed, allow the inferences to be quite fair which some would draw from experiments on plants set in mere sand, &c.; viz. that the earth is of no other use to vegetation than to afford a proper support to the plant, that it be not easily moved out of its place; because the experiments made on single vegetables are always performed in or very near houses, where the air is by no means so pure as in the open fields, and consequently where they have an opportunity of receiving as much nourishment from the air as may compensate the want of what they would have derived from the earth if planted in a rich soil. Lord Kaimes, in the Gentleman Farmer, mentions an experiment wherein a pea was planted on some cotton spread on water, in a vial. It sprung, and pushed roots through the cotton into the water. The plant grew vigorously, and, at the time of his writing the experiment, carried large pods full of ripe seed.—From this experiment, or others of a similar kind, however, a farmer would not be thought to act very judiciously, who should conclude that nothing more was requisite to produce a plentiful crop, than to keep his fields constantly soaking with water, and apply his labour only for that purpose, without regarding either tillage, manure, or the difference of soils. Experience has abundantly shewn, that by certain operations performed on the earth itself, it is rendered much more capable of supplying vegetables with plenty of nourishment than if such operations were omitted; and that some kinds of soils cannot without certain additions be rendered so fit for this purpose as others; and this is what constitutes the difference between a *rich* and a *poor* soil.

Chemists have distinguished the different kinds of earths into particular classes*, from whence we might expect some insight into the nature of different soils; but so far from this, that species of earth, which alone is capable of supplying the vegetable kingdom with nourishment in the greatest plenty, seems entirely overlooked, and is scarce ever mentioned. This kind of earth is the most common of any, and is found in its greatest perfection in well cultivated gardens. It is not however, even in these, found in perfect purity; being constantly mixed with greater or less proportions of sand, small stones, &c. It can be had by itself, and entirely separated from all other substances, only by suffering vegetable or animal bodies to putrify. By undergoing this operation, they are at last resolved into a kind of earth, which appears perfectly the same, from whatever substance it is produced. Of this earth Dr Lewis gives us the following characters. It is indissoluble in acids, somewhat tenacious when moistened with water, friable when dry, and acquires no additional hardness in the fire.—The chemistry of nature, and of art, however, are so very dissimilar, that an account of the chemical properties of this earth can be but of very little service to the practice of agriculture; however, to those above mentioned we may add, that when it is distilled with a violent fire, a volatile alkaline spirit, and fetid oil, similar to those of hartshorn or other animal substances, are obtained.

See Chemistry, n^o 33.

Of the true vegetable earth.

As the volatile alkali is known to be produced in great plenty by distilling putrid substances either animal or vegetable, the obtaining an alkaline spirit from this kind of earth is a strong argument of its being much impregnated with the putrid effluvia, which we have already mentioned as the proper vegetable food contained in the air and water. Indeed, considering that this kind of earth is produced by putrefaction, it is next to an impossibility that it should not be impregnated with putrid steams, as much as earth can be; and if the earth which is most impregnated with these steams is found to afford the greatest quantity of nourishment to vegetables, we have from thence an additional proof that they live on the putrid matter emitted from dead animals and vegetables like themselves.

⁹ This earth impregnated with putrid effluvia.

That we may be the more ascertained of this, it must be considered, that the earth, which undoubtedly is the great source of nourishment to vegetables, is capable of absorbing putrid effluvia more powerfully, or at least in much greater quantity, before it is saturated, than either the air or water. The practice of burying dead bodies is an undeniable proof of this. They are laid but a small depth under ground; yet the abominable stench emitted by the dead carcase is retained in the earth, so that it never penetrates in such a manner as to be offensive. That earth may be saturated with this putrid matter, as well as air or water, is very certain; and, in case of such a saturation, no doubt either of these will take up the superfluous quantity, and become noxious: but unless the earth is fully saturated, both of them will deposit part of what they themselves contain in the earth, and by that means become more salutary than they were before.

¹⁰ Earth is capable of absorbing putrid steams in prodigious quantities.

That earth is capable of attracting putrid effluvia from the air, perhaps, may not be so readily granted; and indeed we know of no experiment whereby it can be shewn that putrid air is made salutary by having any kind

¹¹ Agreeable odour emitted by moist earth.

THEORY. kind of earth agitated in it: but if we consider the exceeding great salubrity of the air in the country, and the healthiness of those who follow the plough or are employed in digging the ground, we must at least allow, that when the ground is turned up, it communicates no kind of noxious quality to the air; which it most certainly would do, if it emitted a putrid effluvia. So far from this, the smell of moist earth is always agreeable and wholesome; and here we have the satisfaction to find our theory somewhat confirmed by the celebrated Baron van Swieten, late physician to the emperors of Hungary.

"Physicians" says he "usually advise their patients to rustication, not only that they may enjoy a pure and freely circulating air, but that, as their strength increases, they may, disengaged from all care, exercise their body by the slighter labours of agriculture, and other country amusements.

"There may perhaps be another cause why rustication will be of benefit in consumptions. It is well known, that, after some days drought, on the falling of rain that moistens the earth, there arises a grateful smell, which we all are sensible of; and this is commonly attributed to the vegetables, which before sapless, but now refreshed by rain, perspire more copiously. But Reaumur observed, that a like fragrant is also perceptible after rain when the corn has been cut down in the fields, where there only remains dry stubble; and examining the matter more particularly, he found that dry earth is without smell, but as soon as it is moistened to the degree of having the confidence of softish pap, it then diffuses a strong smell; but if more water is added, the smell is diminished, nay even quite dissipated. Neither does it seem an easy matter to exhaust that power of producing smells which the earth is possessed of. Every day, during a fortnight, he made cakes of moistened earth; and having dried and wetted them over again, he could not perceive that the earth was less fragrant after all these repeated experiments, if it was again wetted. He further observed, that this fragrant does not diffuse itself to any thing at a great distance, without being much diminished, and soon entirely gone.—It has been observed, that this expiration of the earth ceases if thunder and storms soon follow: while they continue, it begins to return; and when over, the same fragrant of the earth for some hours affects the smell of a man as he walks along over a considerable tract of ground. There is no one, I believe, but has sometimes made this observation; and hence the earth, when moistened to a certain degree, seems to exhale fragrant odours, and indeed various in various places, as we are sensible of from their diversity. They are for the most part of a salubrious quality; as some persons quite faint and languid in the summer-beats perceive themselves wonderfully refreshed, whilst, after rain, they snuff up the fragrant odour. In some places those effluvia are perhaps bad, and may be the causes of diseases."

This property of emitting a fragrant smell is likewise taken notice of by Dr Home in his Principles of Agriculture and Vegetation. Some physicians have prescribed a bath of earth for the cure of consumptive patients; and Dr Solano de Luque was of opinion, that the earth had the property of absorbing contagious miasmata into it: and we are certain, that whether it can absorb these miasmata from living bodies

or not, it certainly can absorb them from dead ones; for a piece of putrid meat will be much sweetened by lying for a short time in the ground.

From all this we cannot indeed infer, that putrid air is sweetened by mere earth; but we discover what is perhaps more important, namely, that though earth is the common receptacle of all putrid matters both animal and vegetable, there is a change made on them when in it, which cannot be made either by air or water. Thus, if the carcase of a small animal is left to putrefy in the air, it becomes exceedingly offensive, and continues so from first to last. The same thing happens if it is left to putrefy in water. But, in earth, the case is quite different. After the carcase is consumed, the earth which has imbibed all the putrid steams, instead of exhaling an offensive odour, diffuses an agreeable one; and thus we may see that it is endued with a power no less remarkable than that of attraction or repulsion, and which we may distinguish by the name of *transmutation*. With regard to water, the case is more evident; for the most putrid water will be sweetened by percolation through earth, or even running in a channel for some time on its surface; but if it contains any impurities of the saline kind, they will not be separated, or at least in very small quantity.

The existence of such a power as that of transmutation we will be obliged to own, whatever we imagine the vegetable food to consist of; for it is impossible to solve the phenomena of vegetation by attractions and repulsions. If we suppose the vegetable food to be salt, let us attract and repel salt as we will, it remains salt from first to last. Let us suppose it water, the case is the same; and, by mere attraction, nothing but masses of salt, or pools of water, could be produced. The case is the same on our own hypothesis; for, supposing plants composed of the putrid effluvia of others, and of dead animals, if nature was endued with no other power than attraction or repulsion, the vegetable behaved to be a corrupted mass like that of which it was composed.—This power, as we have already seen, resides only in the earth, and in the vegetables themselves; air and water can indeed act as powerful solvents, but cannot transform or compound.

We must next consider the nature of those different operations, which, from time immemorial, have been performed on the earth, in order to cause it produce the greatest crops of vegetables. If all of these shall be found conspiring to one general purpose, then the shortest and most easy method of attaining that purpose is undoubtedly the most proper to be practised in agriculture, whether it hath been as yet put in execution or not. These are,

1. *Frequent ploughing, or fallowing.* The immediate consequences of this is to expose different quantities of the soil to the action of the air and sun, which will not fail to exert their solvent powers upon it. In consequence of this action, the earth is partly reduced to powder; many of the roots of vegetables, with which it always abounds, are dissolved and putrified; and the earth produced from them mixes with the rest, as well as the effluvia they emit during their dissolution. The earth soon begins again to exert its prolific quality, and a crop of vegetables is produced. By a repetition of the ploughing, these are turned with their roots upwards,

THEORY.

¹²
Power of transmutation in the earth ascertained.

¹³
Attraction insufficient to solve the phenomena of vegetation.

¹⁴
Confirmation of the above theory from the different operations of agriculture.

¹⁵
Fallowing.

THEORY. wards, are exposed to the solvent powers of the air and light, in consequence of which they die, are putrefied, and more of the native soil is reduced to powder, and mixed with them. By a frequent repetition of this process, the soil becomes vastly more tender, and approaches to the nature of garden-mould, and its fertility is considerably increased.

16 Lord Kaimes is of opinion, that the reason of the fertility of any soil being increased by fallowing, is, that its capacity of retaining water is increased. But this we are absolutely deny; for so far from being more disposed to retain water by its pulverisation, the soil is evidently more disposed to part with it, either by evaporation, or by suffering the moisture to percolate thro' it. In this respect it is far inferior to clay; for tho' dry garden-mould absorbs water much more quickly than clay, it also dries much sooner, and thus all the advantage is lost.

17 To those who reckon the food of vegetables to consist of oils or salts, the operation of fallowing ground must appear an useless one, as it can tend neither to produce oils nor salts, but to destroy them. As its utility, however, cannot be denied, the favourers of this theory imagine, that the ground, by repeated operations of this kind, is fitted for attracting the nitrous salts from the air: but it is found, that these salts cannot be attracted by earth, or any other substance, even when exposed for a great length of time to the air with a view to produce salt-petre; which gives a strong suspicion against their existence*; and even if nitre is mixed with the soil, it is found to be detrimental, and will kill or poison plants instead of nourishing them.

* See *Chemistry*, no 177.

18 *2. Overflowing the ground with water.*—This is found prodigiously to increase the fertility of any soil. It is well known how much Egypt owes to the annual overflowing of the Nile; and even in this country the overflowing of any ground is found to be attended with great advantage. This is practised by Mr Bakewell of Leicesterhire, famous for his improvements in the breed of cattle; and he finds it fully to answer an annual manuring of any other sort. It is also recommended by Mr Anderson of Monkhill, in his essays on agriculture.

19 The fertilizing quality of water will easily be accounted for on the same principles. When grown vegetables are covered with water, their growth, however vigorous before, is immediately stop'd, unless they be of the aquatic kind; they die, are dissolved, and putrefied; in which case, their finer parts are undoubtedly absorbed by the earth: and thus the *floating*, as it is called, of fields with water, answers the purpose of fallowing, with very little trouble. This is not all: for stagnating water always deposits a sediment, which, mixing with the dissolved parts of the vegetables all over the field, forms an excellent manure; and when the water is allowed to run off, the heat of the sun soon brings the highest degree of putrefaction on the dead vegetables, the effluvia of which, mixing with the mud deposited from the water, makes it exceedingly rich.

20 Upon the supposition of oily and saline food for vegetables, this operation must certainly be prejudicial; for nothing can so effectually deprive any substance of salt, as steeping it in water. Neither will water either deposit oil from itself, or suffer it to mix with the ground if accidentally brought to it; nay, though a field were

previously impregnated with oil, upon overflowing it with water, great part of the oil would be separated, and rise to the top: so that, in either case, this operation behaved to impoverish land, rather than enrich it; and as vegetables are found to be supplied with food in plenty, by an operation which must undoubtedly tend to take away both oils and salts from them, we cannot help thinking this a demonstration that their food is composed neither of oil nor salt.

3. Manuring, or mixing the soil with different substances.—We shall here confine ourselves to those which are of undoubted efficacy, and have their credit established by long experience. These are, 1. lime, chalk, marle, shells, or other earths called by the chemists *calcareous earths*; 2. foot; 3. ashes; 4. dung of different kinds.—(1.) The lime, chalk, marle, and shells, are all found to be of the same nature. The marle differs from the rest, only in having a mixture of clay along with its calcareous part. These contain neither salt nor oil of any kind; they readily imbibe water, and as readily part with it. Quicklime, indeed, retains water very obstinately; but such lime as is laid upon the ground soon returns to the same state in which it originally was, and powdered limestone is found to answer as well for the purposes of manure as that which has been burnt; so that here we may consider them all as substances of the same class.—If any of these substances are mixed with dead animal or vegetable bodies, they remarkably quicken their dissolution and corruption, as appears from Sir John Pringle's experiments on putrefaction. When mixed with the soil, therefore, they must undoubtedly exert their powers on such substances as they find there, in the same manner as they do on others; that is, they must hasten their dissolution and putrefaction, and give the pure vegetable mould an opportunity of absorbing their putrid steams, and consequently of being fertilized by it in the same manner as by putrid substances of any kind. (2.) Those who contend for oily and saline principles in the vegetable food, avail themselves of the usefulness of foot as a manure; which is not only oily of itself, but affords a great quantity of volatile salt, along with some neutral sal-ammoniac. It must be remembered, however, that not an atom either of volatile salt or sal-ammoniac can be extracted from foot without a considerable heat, which no soil can give, nor could any vegetable bear. Neither doth its oil appear without a great degree of heat: and though it feels somewhat unctuous to the touch, this is but a mere deception; for no true oil, capable of floating on water, can be obtained from foot without distillation. It is impossible, therefore, that foot can act upon the soil either as an oily or a saline substance; how far it is capable of dissolution by putrefaction, or being otherwise converted into an earth, hath not yet been determined by experiments; but as it yields, on distillation, the same principles which are obtained from animal or putrefied vegetable substances, it is probable that foot enriches the ground in the same manner that they do. (3.) The use of ashes in manure is likewise urged as an argument for the food of vegetables being of a saline nature; as it is known, that the common alkaline salts are procured by lixiviating the ashes of wood and other vegetables. Experience, however, shews us, that ashes are no less fit for manure after the salt is extracted from them than before.

21 Of manures, and their operation.

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before. Indeed, if there is any difference, it is in favour of the washed ashes. The alkali itself, though in Sir John Pringle's experiments it was found to be *antiseptic*, or a resister of putrefaction, is nevertheless a powerful dissolvent; and as it must soon lose its alkaline properties when mixed with the earth, in consequence of the universal existence of the vitriolic acid *, those substances which it has dissolved will be more disposed to putrefaction than before, and consequently tend to fertilize the ground in the manner we have already described. The washed ashes are *septic*, or promoters of putrefaction, and consequently act in the same manner as chalk or limestone. (4.) All kinds of dung are so much disposed to putrefaction, that it is difficult to imagine any other way in which they can be serviceable to vegetation than by their putrid effluvia.—People indeed may dream of imaginary salts in dung; but if they considered, or even knew the difficulty of procuring salt of any kind from dung, they would probably alter their sentiments. The volatile salts procured from this as well as other animal-matters are mere creatures of the fire: putrid urine produces them indeed without heat, but scarce any other animal-substance *. Nevertheless other putrid substances will fertilize the ground as well as urine, and therefore must act in some other way than by their salts. Tho' Dr Priestley's experiments had never been made, we could have formed no other rational supposition concerning the manner in which putrid substances fertilize the earth than what we have already done; but as he has shewn that vegetables are prodigiously increased in bulk by the mere contact of these putrid steams, where no saline substance could have access to them, we cannot help thinking this a decisive experiment concerning the manner in which the ground is fertilized by manuring with dung or other putrid substances.

23
Effects of saline substances on growing vegetables.

We shall conclude this part of the subject with an account of some experiments concerning the effects of saline substances on the growth of vegetables. The following are related by Lord Kaimes, in his Gentleman Farmer.—“A number of Jerusalem artichokes were set in pots filled with pure sand. One plant was kept as a standard, being nourished with water only. Other plants of the same kind were nourished with water in which salt of tartar, a fixed alkali, was dissolved. These grew more vigorously than the standard plant; but, by reiterated waterings, there came to be such an accumulation of the fixed alkali among the sand, as to make the plants decay, and at last to die. Some plants were nourished with water in which sal-ammoniac, a volatile alkali, was dissolved. These grew also well for some time; but, like the former, were destroyed by frequent reiterations of it. Weak lime-water promoted the growth of its plants more than common water. But water, completely saturated with quicklime, proved more noxious than that which contained a fixed alkali; though less than that which contained a solution of volatile alkali.—Urine promoted, for a long time, the growth of its plants; and the most putrid appeared to have the strongest effect; but at last it totally destroyed them. Water impregnated with putrid animal and vegetable substances did more effectually promote the growth of its plants than any other solution; and in every stage of the process appeared to be salutary.”

With regard to other saline substances there are not

many experiments which can be depended upon concerning their qualities as a manure. Mr Anderfon relates an experiment made with common salt, the success of which, we apprehend, may justly enough be taken as a specimen of what is to be expected from manures of a similar kind.—He marked out a circle of six feet diameter in the middle of a grass-field, which he distinguished by driving a stake in its centre. All over this circle he strewed common salt, which, about the stake, lay near an inch thick on the ground. In this state he left it to the operations of nature. The grass sprung up as usual, neither better nor worse about the stake than in the rest of the field, and the place where the circle was could be distinguished only by the stake, which was left there for some years.

Upon these experiments we need make very few observations. They are so much in favour of our theory, that they seem made on purpose to confirm it. The fixed alkali employed in Lord Kaimes's experiments must first exert its solvent powers on such heterogeneous substances as it met with among the sand; for no sand can be supposed to be perfectly free of these. As long as it exerted its strength on these only, the plant would thrive, for the reasons we have already mentioned; but, having exhausted the small quantity of substances contained in the sand, it would next attack the plant itself, which consequently would decay and die. The same effects behoved to follow in a greater degree from strong lime-water which contains lime in its caustic state; for this is a more powerful solvent than fixed alkali itself, and would not fail to destroy every thing it touched; nor is it at all improbable that the plant would seem to grow vigorously by the dissolution of part of its own roots, more nourishment being by this means given to those which remained sound.—Volatile alkali is likewise a powerful solvent; but, by reason of its volatility, would exert its caustic power on the plant sooner than either lime, or fixed alkali; and accordingly it seems to have been the most destructive of any thing that was tried. It seems owing to this, that putrid urine at last destroyed the plants whose growth it so long promoted; while water impregnated with other putrid matters which yield no volatile alkali without heat, proved always salutary.

From all this we may draw the following general conclusion, *viz.* That the principal end which a farmer ought to keep in view, is to impregnate his ground as much as possible, with substances which either actually contain putrid matter, or which are in their own nature *septic*, or promoters of putrefaction. To impregnate the air with putrid effluvia is impossible; and though it could be done, would be highly dangerous; for however salutary such effluvia may be to vegetables, nothing can be more fatal to mankind. The putrid substances therefore can only be used by mixing them with the earth; and in whatever manner they can be most perfectly, and in the greatest quantity, mixed with the soil, there the best crops may be expected.

SECT. III. Of the different Soils, and the Manures most proper for each.

ACCORDING to the theory we have just now laid down, the richest soil must be that which contains the greatest quantity of putrid matter, either animal or vegetable; and such is the earth into which animal and vegetable

THEORY.

23
Common salt insectual as a manure.

24
End to be kept in view by a farmer.

25
Richest soils must at last be improved.

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vegetable substances resolve themselves. Was this earth to be had in perfection, it is evident it could not stand in need of manure of any kind, or be in the least enriched by it; for containing an immense quantity of putrid matter, it would freely communicate it to the vegetables planted in it, which would grow in the most luxuriant manner, without requiring any other care than that of keeping them constantly supplied with water. If we suppose the crop left upon the ground to putrefy and mix with the earth as before, the soil will contain the same quantity of putrid matter the second year that it did the first, and be equally prolific: but if the crop is removed to another place, and nothing is brought back to enrich the ground in its stead, it is evident that it will contain less of the true vegetable food the second year than it did the first, and consequently be less prolific. For some time, however, the difference will not be perceptible, and people who are in possession of such ground may imagine that they enjoy a soil which will be perpetually fertile; but long experience has taught us, that the richest soils will at last be exhausted by repeated cropping without manure, as according to our theory they ought to be.

Where the ground has been suffered to remain uncultivated for many ages, producing all that time succulent plants which are easily putrefied, and trees, the leaves of which likewise contribute to enrich the ground by their falling off and mixing with it, the soil will in a manner be totally made up of pure vegetable earth, and be the richest, when cultivated, that can be imagined. This was the case with the lands of America. They had remained uncultivated perhaps since the creation, and were endowed with an extraordinary degree of fertility; nevertheless we are assured by one who went to America in order to purchase lands there, that such grounds as had been long cultivated were so much exhausted, as to be much worse than the generality of cultivated grounds in this country. Here, then, we have an example of one species of poor soil, namely, one that has been formerly very rich, but has been deprived, by repeated cropping, of the greatest part of the vegetable food it contained. The farmer who is in possession of such ground would no doubt willingly restore it to its former state; the present question is, What must be done in order to obtain this end? We have mentioned several kinds of manures which long practice has recommended as serviceable for improving ground: we shall suppose the farmer tries lime, or chalk; for, as we have already seen, their operations upon the soil must be precisely the same. This substance, being of a septic nature, will act upon such parts of the soil as are not putrified, or but imperfectly so; in consequence of which, the farmer will reap a better crop than formerly. The septic nature of the lime is not altered by any length of time. In ploughing the ground, the lime is more and more perfectly mixed with it, and gradually exerts its power on every putrescible matter it touches. As long as any matter of this kind remains, the farmer will reap good crops: but when the putrescible matter is all exhausted, the ground then becomes perfectly barren; and the caustic qualities of the lime are most unjustly blamed for *burning* the ground, and reducing it to a *caput mortuum*; while it is plain, the lime has only done its office, and made the soil yield all that it was capable of yielding.

26
One species
of poor soil
destroyed by
lime.

When ground has been long uncultivated, producing all the time plants, not succulent, but such as are very difficultly dissolved, and in a manner incapable of putrefaction; there the soil will be excessively barren, and yield very scanty crops, though cultivated with the greatest care. Of this kind are those lands covered with heath, which are found to be the most barren of any, and the most difficultly brought to yield good crops. In this case, lime will be as serviceable as it was detrimental in the other: for, by its septic qualities, it will continually reduce more and more of the soil to a putrid state; and thus there will be a constant succession of better and better crops, by the continued use of lime, when the quantity first laid on has exerted all its force. By a continued use of this manure, the ground will be gradually brought nearer and nearer the nature of garden-mould; and, no doubt, by proper care might be made as good as any: but it will be as great a mistake to imagine, that, by the use of lime, this kind of soil may be rendered perpetually fertile, as to think that the other was naturally so; for though lime enriches this soil, it does so, not by adding vegetable food to it, but by preparing what it already contains; and when all is properly prepared, it must as certainly be exhausted as in the other case.

Here then we have examples of two kinds of *poor* soils, the one of which is totally destroyed, the other greatly improved, by lime, and which therefore require very different manures; lime being more proper for the last than dung; and dung, being more proper to restore an exhausted soil than lime, ought only to be used for the first. Besides dunging land which has been exhausted by long cropping, it is of great service to let it lie fallow for some time; for to this it owed its original fertility, and what gave the fertility originally cannot fail to restore it in some degree.

By attending to the distinction between the reasons for the poverty of the two soils just now mentioned, we will always be able to judge with certainty in what cases lime is to be used, and when dung is proper. The mere poverty of a soil is not a criterion whereby we can judge; we must consider what hath made it poor. If it is naturally so, we may almost infallibly conclude that it will become better by being manured with lime. If it is *artificially* poor, or exhausted by continual cropping, we may be as certain that lime will entirely destroy it.—We apprehend that it is this *natural* kind of poverty only which Mr Anderson says, in his *Essays on Agriculture*, may be remedied by lime; for we can scarce think that experience would direct any person to put lime upon land already exhausted. His words are.

“Calcareous matters act as powerfully upon land that is naturally poor, as upon land that is more richly impregnated with those substances that tend to produce a luxuriant vegetation.”

“Writers on agriculture have long been in the custom of dividing manures into two classes, *viz. Enriching* manures, or those that tended directly to render the soil more prolific, however sterile it may be; among the foremost of which was dung: *Exciting* manures, or those that were supposed to have a tendency to render the soil more prolific, merely by acting upon those enriching manures that had been formerly in the soil, and giving them a new stimulus, so as to enable them to operate anew upon that soil which they had formerly fertilized.

R 2

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27
A species of
poor soil
meliorated
by lime.

28
Poor soils
how resto-
red.

29
Mr Ander-
son's opin-
ion concern-
ing lime.

THEORY. fertilized. In which class of stimulating manures, *lime* was always allowed to hold the foremost place."

"In consequence of this theory, it would follow, that lime could only be of use as a manure when applied to rich soils,—and, when applied to poor soils, would produce hardly any, or even perhaps hurtful, effects."

"I will frankly acknowledge that I myself was so far imposed upon by the beauty of this theory, as to be hurried along with the general current of mankind, in the firm persuasion of the truth of this observation, and for many years did not sufficiently advert to those facts that were daily occurring to contradict this theory.—I am now, however, firmly convinced, from repeated observations, that lime, and other calcareous manures, produce a much greater *proportional* improvement upon poor soils, than on such as are richer.—And that lime alone, upon a poor soil, will, in many cases, produce a much greater and more lasting degree of fertility than dung alone."

Thus far Mr Anderson's experience is exactly conformable to the theory we have laid down, and what ought to happen according to our principles. He mentions, however, some facts which seem very strongly to militate against it; and indeed he himself seems to proceed upon a theory altogether different.

30
Query concerning the nature of a proper foil.

"Calcareous matter alone" (says he) "is not capable of rearing plants to perfection;—mould is necessary to be mixed with it in certain proportions, before it can form a proper foil. It remains, however, to be determined what is the due proportion of these ingredients for forming a proper foil."

"We know that neither chalk, nor marl, nor lime, can be made to nourish plants alone; and soils are sometimes found that abound with the two first of these to a faulty degree. But the proportion of calcareous matter in these is so much larger than could ever be produced by art, where the soil was naturally destitute of these substances, that there seems to be no danger of erring on that side. Probably it would be much easier to correct the defects of those soils in which calcareous matters super-abound, by driving earth upon them as a manure, than is generally imagined; as a very small proportion of it sometimes affords a very perfect foil. I shall illustrate my meaning by a few examples."

31
Examples of foil perpetually fertile.

"Near Sandhede, in the county of Caithness, there is a pretty extensive plain on the sea-coast, endowed with a most singular degree of fertility. In all seasons it produces a most luxuriant herbage, altho' it never got any manure since the creation; and has been, for time immemorial, subjected to the following course of crops."

"1. Bear, after once ploughing from grafs, usually a good crop."

"2. Bear, after once ploughing, a better crop than the first."

"3. Bear, after once ploughing, a crop equal to the first."

"4. 5. and 6. Natural-grafs, as clove and rich as could be imagined, might be cut, if the possessor so inclined, and would yield an extraordinary crop of hay each year."

"After this the same course of cropping is renewed. The soil that admits of this singular mode of farming, appears to be a pure incoherent sand, destitute of the smallest particle of vegetable mould; but, upon examination, it is found to consist almost entirely of broken

THEORY. shells: the fine mould here bears such a small proportion to the calcareous matter, as to be scarce perceptible, and yet it forms the most fertile foil that ever I yet met with."

"I have seen many other links (downs) upon the sea-shore, which produced the most luxuriant herbage, and the closest and sweetest pile of grafs, where they consisted of shelly sand, which, without doubt, derive their extraordinary fertility from that cause."

"A very remarkable plain is found in the island of *Jir-ey*, one of the Hebrides. It has been long employed as a common; so that it has never been disturbed by the plough, and affords annually the most luxuriant crop of herbage, consisting of white clover, and other valuable pasture-grasses, that can be met with any where. The foil consists of a very pure shelly sand."

"From these examples I think it is evident, that a very small proportion of vegetable mould is sufficient to render calcareous matter a very rich foil. Perhaps, however, a larger proportion may be necessary when it is mixed with clay than with sand; as poor chalky soils seem to be of the nature of that composition."

To these examples brought by Mr Anderson, we may add some of the same kind mentioned by Lord Kaimes. His Lordship having endeavoured to establish the theory of water being the only food of plants, tho' he himself frequently deviates from that theory, yet thinks it possible, upon such a principle, to make a foil perpetually fertile.

"To recruit," (says he,) "with vegetable food, a foil impoverished by cropping, has hitherto been held the only object of agriculture. But here opens a grander object, worthy to employ our keenest industry, that of making a foil perpetually fertile. Such soils actually exist; and why should it be thought, that imitation here is above the reach of art? Many are the instances of nature being imitated with success. Let us not despair, while any hope remains; for invention never was exercised upon a subject of greater utility. The attempt may suggest proper experiments: it may open new views: and if we fail in equalling nature, may we not, however, hope to approach it? A foil perpetually fertile must be endowed with a power to retain moisture sufficient for its plants; and at the same time must be of a nature that does not harden by moisture. Calcareous earth promises to answer both ends: it prevents a foil from being hardened by water; and it may probably also invigorate its retentive quality. A field that got a sufficient dose of clay-marle, carried above 30 successive rich crops, without either dung or fallow. Doth not a foil so meliorated draw near to one perpetually fertile? Near the east side of Fife, the coast for a mile inward is covered with sea-sand, a foot deep or so; which is extremely fertile, by a mixture of sea-shells reduced to powder by attrition. The powdered shells, being the same with shell-marle, make the sand retentive of moisture; and yet no quantity of moisture will unite the sand into a solid body. A foil so mixed, seems to be not far distant from one perpetually fertile. These, it is true, are but faint essays; but what will not perseverance accomplish in a good cause?"

Having thus, in a manner, positively determined, with Mr Anderson, that no dose of calcareous matter can possibly be too great, we cannot help owning ourselves

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self surprised on finding his Lordship expressing himself as follows.

“An over-dose of shell-marle, laid perhaps an inch, and an inch and a half, or two inches thick, produces, for a time, large crops : but, at last, it renders the soil a *caput mortuum*, capable of neither corn nor grass; of which there are too many instances in Scotland : the same probably would follow from an over-dose of clay-marle, stone-marle, or pounded lime-stone.”—To account for this, he is obliged to make a supposition directly contrary to his former one ; namely, that calcareous matter renders the soil *incapable* of retaining water. This phenomenon, however, we think is solved upon the principles above laid down, in a satisfactory manner, and without the least inconsistency.

As to rendering soils perpetually fertile, we cannot help thinking the attempt altogether chimerical and vain. There is not one example in nature of a soil perpetually fertile, where it has no supply but from the air, and the rain which falls upon it. The above recited examples can by no means be admitted as proofs of perpetual fertility. We know, that the grass on the banks of a river is much more luxuriant than what grows at a distance : the reason is, that the water is attracted by the earth, and communicates its fertilizing qualities to it ; but was the river to be dried up, the grass would soon become like the rest. Why should not the ocean have the same power of fertilizing plains near its shores, that rivers have of fertilizing small spots near their banks ? We see, however, that it hath not ; for the sea-shores are generally sandy and barren. The reason of this is, that the waters of the ocean contain a quantity of loose acid ;* and this acid is poisonous to plants ; but, abstracting this acid part, we hesitate not to affirm, that sea-water is more fertilizing than river-water. It is impossible to know how far the waters of the ocean penetrate under ground, through a sandy soil. Where they meet with nothing to absorb their acid, there the ground is quite barren : but, in passing through an immense quantity of broken shells, the calcareous matter, we are very certain, will absorb all the acid ; and thus the soil will be continually benefited by its vicinity to the ocean. All the above fields, therefore, are evidently supplied with nourishment from the ocean : for, if the salt-water has sufficient efficacy to render fields which are in its neighbourhood barren, why should it not render them fertile when the cause of barrenness is removed from its waters ?

After all, the field in Caithness, mentioned by Mr Anderson, seems to have been perpetually fertile only in grass : for though, the second year, it carried a better crop of bear than it did the first ; yet, the third year, the crop was worse than the second, and only equal to the first. Had it been ploughed a fourth time, the crop would probably have been worse than the first. Ground is not near so much exhausted by grass as corn, even though the crop be cut, and carried off ; and still less, if it only feeds cattle, and is manured by their dung ; which appears to have been the case with this field. Lord Kaimes, indeed, mentions fields in Scotland, that, past memory, have carried successive crops of wheat, pease, barley, oats, without a fallow, and without a manure ; and particularizes one on the river Carron, of nine or ten acres, which had carried 103 crops of oats without intermission, and without manure : but as we

are not acquainted with any such fields, nor know any thing about their particular situation, we can form no judgment concerning them.

Besides the two kinds of soils abovementioned, there are others, the principal ingredient of which is clay, or sand. The first of these is apt to be hardened by the heat of the sun, so that the vegetables can scarce penetrate it in such a manner as to receive proper nourishment. The second, if it is not situated so as to receive a great deal of moisture, is very apt to be parched up in summer, and the crop destroyed ; nor has it sufficient adhesion to support plants that have few roots and grow high. From these opposite qualities, it is evident, that these two soils would be a proper manure for one another ; the clay would give a sufficient degree of firmness to the sand, and the sand would break the too great tenacity of the clay. According to Dr Home's experiments, however, sand is the worst manure for clay that can be used. He recommends marle most. To reduce clay-ground as near as possible to the form of pure vegetable mould, it must first be pulverized. This is most effectually performed by ploughing and harrowing ; but care must be taken not to plough it whilst too wet, otherwise it will concrete into hard clots, which can scarcely be broken. After it is pulverized, however, some means must be taken to keep it from concreting again into the same hard masses as before. According to Lord Kaimes, though clay, after pulverization, will concrete into as hard a mass as before, if mixed with water ; yet if moistened with dung-hill juice, it will not concrete any more. Lime also breaks its tenacity, and is very useful as a manure for this kind of soil.

The conclusion we wish the practical farmer to draw from our theory is, That there is a certain limit to the fertility of the earth, both as to duration, and to degree, at any particular time : that the nearer any soil approaches to the nature of pure garden-mould, the nearer it is to the most perfect degree of fertility ; but that there are no hopes of keeping it perpetually in such a state, or in any degree of approximation to it, but by constant and regular manuring with dung. Lime, chalk, marle, &c. may be proper to bring it near to this state, but are absolutely unfit to keep it continually so. They may indeed for several years produce large crops : but the more they increase the fertility for some years, the sooner will they bring on an absolute barrenness ; while regular manuring with plenty of dung, will always ensure the keeping up the soil in good condition, without any occasion for fallow. What we have said concerning the use of lime, &c. applies likewise to the practice of frequent ploughing, though in a less degree. This tends to meliorate ground that is naturally poor, by giving an opportunity to the vegetable parts to putrefy ; but, when that is done, it tends to exhaust, though not so much as lime. A judicious farmer will constantly strive to keep his lands always in good condition, rather than to make them suddenly much better ; lest a few years should convince him that he was in reality doing almost irreparable mischief, while he fancied himself making improvements. As for the ridiculous notions of stimulating the ground by saline manures, we hope they will never enter the brain of any rational practitioner of agriculture.

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34
Clay and
sandy soils.

35
Fertility of
the earth li-
mited.

SECT. IV. *Of the different kinds of Vegetables proper to be raised with a view to the Melioration of Soil.*

³⁶
Soil pulverized by certain vegetables.

THE methods of meliorating soils, which we have mentioned above, consisting of tedious and laborious operations that yield no return at first, it is natural for a farmer to wish for some method of meliorating his ground, and reaping crops at the same time. One very considerable step towards the melioration of ground, is its pulverisation. This is accomplished by repeated ploughings, as already mentioned; especially if performed in autumn, that the ground may be exposed to the winter's frost; but these ploughings yield no crop, as long as the field is not sown. By planting in the field, however, those vegetables whose roots swell to a considerable bulk, the ground must constantly be acted upon by the swelling of their roots in all directions; and thus the growing of the crop itself, may be equal, or superior, in efficacy to several ploughings, at the same time that the farmer enjoys the benefit of it. The plant most remarkable for the swelling of its roots, is the potatoe; and by none is the ground meliorated more, or even so much. They are not, however, equally proper for all soils. In clay they do not thrive, nor are palatable; but in hard gravelly or sandy soils, they grow to a large size, and are of an excellent quality. Turneps likewise contribute to meliorate the ground, by the swelling of their roots, though not so much as potatoes. They have this advantage, however, that they will thrive in almost any soil. In clay ground, pease and beans thrive exceedingly well, and therefore are proper in this kind of soil as a preparatory for other kinds of grain. These push their roots deep into the ground, and cover it with their leaves more than other crops; so that the sun has not so much access, as when it is covered with other kinds of grain. Where-ever any of these kinds of vegetables are raised, it is observable that more or less blackness is communicated to the soil: an evident sign of its melioration; this being the colour of the true vegetable mould, or *lummy soil*, as it is called.

Besides the above-mentioned plants, carrots, parsnips, cabbages, and all those vegetables which sink their roots deep in the ground, answer the same purpose of loosening and pulverizing the earth; but as they will not thrive but on ground already well cultivated, they cannot be raised to any advantage for the purpose of meliorating a poor soil.

It hath been customary in many places, particularly in England, to sow turnip, pease, buck-wheat, &c. and then to plough them down for manuring the land.— This, being similar to that operation of nature by which she renders the uncultivated soils so exceedingly fertile, cannot fail of being attended with singular advantages; and might be looked upon as preferable even to driving dung on the land to fatten it, was it not attended with the entire loss of a crop for that year.

SECT. V. *Of destroying Weeds.*

WHAT we have already said regarding the cultivation of the soil, respects only the fitting it for producing all kinds of vegetables indiscriminately. Experience; however, shews, that the ground is naturally much more disposed to produce and nourish some kinds of vegetables than others; and those which the earth

seems most to delight in, are commonly such as are of very little use to man; but if neglected, will increase to such a degree as entirely to destroy the plants intended to be raised, or at least hinder them from coming to perfection, by depriving them of nourishment. The clearing the ground of weeds, therefore, is an article no less necessary in agriculture, than the disposing it to produce vegetables of any kind in plenty.

The weeds may be divided, according to the time of their duration, into *annual*, or such as spring from a seed, and die the same year; and *perennial*, that is, such as are propagated by the roots, and last for a number of years. The first kind are the least noxious, and most easily destroyed. For this purpose it will be sufficient to let them spring up till near the time of ripening their seed, and then plough them down before it comes to maturity. It is also of service to destroy such weeds as grow in borders, or neglected corners, and frequently scatter their seeds to a great distance; such as the thistle, dandelion, rag-weed, &c. for these are sufficient to propagate their species through a deal of ground; as their seeds are carried about with the wind to very considerable distances. A farmer ought also to take care, that the small seeds of weeds, separated from corn in winnowing, be not sown again upon the ground; for this certainly happens, when they are thrown upon a dunghill; because, being the natural offspring of the earth, they are not easily destroyed. The best method of preventing any mischief from this cause, would be to burn them.

Perennial weeds cannot be effectually destroyed, but by removing the roots from the ground, which is often a matter of some difficulty. Many of these roots strike so deep in the ground, that they can scarcely be got out. The only method that can be depended upon in this case, is frequent ploughing, to render the ground as tender as possible; and harrowing with a particular kind of harrow which shall hereafter be described, in order to collect these pernicious roots. When collected, they ought to be dried and burnt, as the only effectual method of insuring their doing no further mischief.

There is a particular species of weed, peculiar only to grass-lands, of a soft spongy nature, called *fog*, which it is found very difficult to exterminate. Where the land can be conveniently tilled, this weed may be destroyed by covering it with a crop of pease, potatoes, &c.: or, passing a heavy roller over the ground will be of great service; for fog owes its origin to too great a laxity of the soil, and will not grow upon firm ground.

Besides these kinds of weeds which are of an herbaceous nature, there are others which are woody, and grow to a very considerable size; such as broom, furze, or whins, and thorns. *Broom* is an evergreen shrub, that thrives best in sandy soil; and there it grows so vigorously, as scarce to admit any grass under it. It propagates by seed which grows in pods; and these, when fully ripe, break with violence, scattering the seeds all around. Thus, a field which is overgrown with broom, besides the old plants, always contains an infinite number of young ones; so that though the old plants die when cut over, a fresh crop constantly springs up. It may, however, be destroyed by frequent ploughing and harrowing, in the same manner as other perennial weeds are; for it does not for some time carry any seed,

³⁷
Weeds divided into annual and perennial.

³⁸
Perennial weeds how destroyed.

³⁹
Broom, furze, &c. how destroyed.

The *whin* is a fine evergreen shrub, carrying a sweet-smelling flower all the year round. It propagates both by seed, and by its roots, which spread sometimes to the distance of ten or twelve feet; and hence, when once established, it is very difficultly extirpated. The best method is to set fire to the whins in frosty weather; for frost has the effect to wither whins, and make them burn readily. The stumps must then be cut over with a hatchet; and when the ground is well softened by rain, it may be ploughed up, and the roots taken out by a harrow adapted to that purpose.—If the field is soon laid down to grass, the whins will again spring up in great abundance, from the seeds, and small parts of the roots left in the ground. In this case, pasturing with sheep is an effectual remedy; as they are no less fond of young whins than of young broom; and if there are a sufficient number, they will not leave a single plant above ground. But if grass is not immediately wanted, the most effectual method of clearing a field of whins, is by reiterated ploughings.

The *thorn*, or *bramble*, spreads its roots very wide, and at the same time sinks them deep in the earth. Though cut in the winter, it rises, and comes to such perfection as to carry fruit in summer. It can only be extirpated by ploughing up the ground, and collecting the roots.

SECT. VI. Of the most proper kinds of Vegetables to be raised for the purposes of feeding Cattle.

THOUGH this must be an article of the utmost consequence to every farmer, we do not find that it has been much considered. Mr Anderson seems to have been the first writer on agriculture who hath properly attended to this subject; and what he hath wrote upon it, is rather a catalogue of desiderata, than any thing else: and indeed the desiderata on this subject are so many and so great, that we must acknowledge ourselves very unable to fill them up.—To attain to a competent knowledge in this respect, the following things must be taken into consideration. (1.) The wholesomeness of the food for cattle, with regard to health and strength, or fatness. (2.) The quantity that any extent of ground is capable of yielding. (3.) The quantity necessary to feed the different kinds of cattle. (4.) The labour of cultivation; and, (5.) The soil they require to bring them to perfection, and the effect they have upon it.

With regard to the wholesomeness, it is plain, that as the natural food of wild cattle is the green succulent plants they meet with all the year round, food of this kind, could it be had, must be preferable to hay; and accordingly we find that cattle will always prefer succulent vegetables where they can get them. To find plants of this kind, and having proper qualities in other respects, we must search among those which continue green all the year round, or come to their greatest perfection in the winter-time.—Of these, cabbages bid fair for holding the first place; both as being very succulent, and a very large quantity of them growing upon a small space of ground. In Mr Young's Six Months Tour, we have an account of the produce of cabbages in many different places, and on a variety of soils. The produce by Mr Crow at Keplin, on a clay soil, was, on an average of six years, 35 tons per acre; by Mr Smelt at the Leaves, on a sandy gravel, 18 tons per acre; by Mr Scoop at Danby, on an average of six years, 37 tons per acre: and the general average of all the accounts giving by Mr Young, is 36 tons per acre.

Cabbages, however, have the great inconvenience of sometimes imparting a disagreeable flavour to the milk of cows fed with them, and even to the flesh of other cattle. This, it is said, may be prevented by carefully picking off the decayed and withered leaves: and very probably this is the case; for no vegetable inclines more to putrefaction than this; and therefore particular care ought to be taken to pull off all the leaves that have any symptoms of decay. Dr Priestley found that air was rendered noxious by a cabbage-leaf remaining in it for one night, though the leaf did not shew any symptom of putrefaction.—For milk-cows, probably the cabbages might be rendered more proper food by boiling them.

Turnips likewise produce very bulky crops, though far inferior to those of cabbages. According to Mr Young's calculation, the finest soil does not produce up above five tons of turnips per acre; which is indeed a very great disproportion: but possibly such a quantity of turnips may not be consumed by cattle as of cabbages; an ox, of 80 stone weight, eat 210 lb of cabbages in 24 hours, besides seven lb. of hay.

Carrots are found to be an excellent food for cattle of all kinds, and are greatly relished by them. In a rich sand, according to Mr Young's account, the produce of this root was 200 bushels per acre. In a finer soil, it was 640 bushels per acre. A lean hog was fatted by carrots in ten days time: he eat 196 lb; and his fat was very fine, white, firm, and did not boil away in the dressing. They were preferred to turnips by the cattle; which having tasted the carrots, soon became so fond of them as difficultly to be made to eat the turnips at all. It is probable, indeed, that carrots will make a more wholesome food for cattle than either cabbages or turnips, as they are strongly antiseptic; inasmuch as to be used in poultices for correcting the fumes of cancers. It is probably owing to this, that the milk of cows fed on carrots is never found to have any bad taste. Six horses kept on them thro' the winter without oats, performed their work as usual, and looked equally well. This may be looked upon as a proof of their salubrity as a food; and it certainly can be no detriment to a farmer to be so much versant in medical matters as to know the impropriety of giving

47
Cabbages,
their properties.

48
Air rendered
noxious
by them.

43
Turnips.

44
Carrots.

45
Qualities of
the food re-
quisite for
cattle.

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giving putrescent food to his cattle. It is well known, what a prodigious difference there is in the health of the human species when fed on putrid meats, in comparison of what they enjoy when supplied with food of a contrary nature; and why may there not be a difference in the health of beasts, as well as of men, when in similar circumstances?—It is also very probable, that as carrots are more solid than cabbages or turnips, they will go much farther in feeding cattle than either of them. The above-mentioned example of the hog, seems some kind of confirmation of this; he being fed, for ten days together, with 21 lb less weight of carrots, than what an ox devoured of cabbages and hay in one day. There is a great disproportion, it must be owed, between the bulk of an ox, and that of a hog; but we can scarce think that an ox will eat as much at a time as ten hogs. At Parlington in Yorkshire, 20 work horses, four bullocks, and six milk-cows, were fed on the carrots that grew in three acres, from the end of September till the beginning of May; and the animals never tasted any other food but a little hay. The milk was excellent, and thirty hogs were fattened upon what was left by the other cattle.

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Potatoes.

Potatoes likewise appear to be a very palatable food for all kinds of cattle; and not only oxen, hogs, &c. are easily fed by them, but even poultry. The channels of potatoes compared with other kinds of food for cattle, cannot well be known, as, besides the advantage of the crop, they improve the ground more than any other known vegetable. The quantities of this root required to feed different kinds of cattle are not known, nor how far the food itself is salutary; though it is probable, that as the human species find no detriment from the use of potatoes, neither will cattle of any kind.

The above-mentioned vegetables have all of them the property of meliorating, rather than exhausting the soil; and this is certainly a very valuable qualification: but carrots and cabbages will not thrive except in soils that are already well cultivated; while potatoes and turnips may be used as the first crops of a soil with great advantage. In this respect, they are greatly superior to the others; as it may be disagreeable to take up the best grounds of a farm with plants designed only for food to cattle.

46
Whins an
excellent
food for
horses.

Whins have lately been recommended as a very proper food for cattle, especially horses; and are recommended by Mr Anderson, in a particular manner. They have this advantage, that they require no culture, and grow on the very worst soil; but they are troublesome to cut, and require to be bruised in a mill constructed for this purpose; neither is the ground at all meliorated by letting whins grow upon it for any length of time. Notwithstanding these disadvantages, however, as whins continue green all the year round, and when bruised will afford an excellent succulent food, which seems possessed of strongly invigorating qualities, they may be looked upon as the cheapest winter-food that can possibly be given to cattle.—According to the calculations of Mr Eddison of Gateford, a single acre, well cropped with whins, will winter six horses: at three or four years growth, the whole crop should be taken, cut close to the ground, and carried to the mill; in which the whins are to be bruised, and then given to the horses. Four acres ought to be planted, that one may be used each year, at the proper age to

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be cut; and he reckons the labour of one man sufficient for providing food to this number of horses. He says they all prefer the whins to hay, or even to corn.

47
Burnet.

The herb called *burnet* hath likewise been recommended as proper food for cattle, on account of its being an evergreen, and further recommended, by growing almost as fast in winter as in summer. Of this herb, however, we have very various accounts. In a letter addressed by Sir James Caldwell F. R. S. to the Dublin Society, the culture of this plant is strongly recommended on the authority of one Bartholomew Rocque, farmer at Walham-Green, a village about three miles south-west of London.

What gave occasion to the recommendation of this plant, was, that, about the year 1760, Mr Wych, chairman of the Committee of Agriculture of the London Society, for the encouragement of arts, manufactures, and commerce, came to Rocque (who was become very eminent by the premiums he had received from the society), and told him, he had been thinking, that as there are many animals which subsist wholly upon the fruits of the earth, there must certainly be some plant or herb fit for them, that naturally vegetates in winter; otherwise we must believe the Creator, infinitely wise and good, to have made creatures without providing for their subsistence; and that if there had been no such plants or herbs, many species of animals would have perished before we took them out of the hands of nature, and provided for them dry meat at a season, when, indigenous plants having been indiscriminately excluded, under the name of weeds, from cultivated fields and places set apart for natural grass, green or fresh meat was no longer to be found.

Rocque allowed the force of this reasoning; but said, the knowledge of a grass, or artificial pasture, that would vegetate in winter, and produce green fodder for cattle, was lost; at least, that he knew of no such plant.—Mr Wych, however, knowing how very great the advantage would be of discovering a green fodder for winter, and early in the spring, wrote to Bern, and also to some considerable places in Sweden, stating the same argument, and asking the same question. His answers to these letters were the same that had been given by Rocque. They owned there must be such a plant, but declared they did not know it.

Mr Wych then applied again to Rocque; and desired him to search for the plant so much desired, and so certainly existing. Rocque set about this search with great assiduity, and finding that a pimpernel, called *burnet*, was of very speedy growth, and grew near as fast in winter as in summer, he took a handful of it and carried it into his stable, where there were five horses, every one of which eat of it with the greatest eagerness; snatching it even without first smelling it. Upon the success of this experiment he went to London, and bought all the burnet-feed he could get, amounting to no more than eight pounds, it having been only used in fallads; and he paid for it at the rate of 4 s. a pound. Six of the eight pounds of feed he sowed upon half an acre of ground, in March, in the year 1761, with a quarter of a peck of spring-wheat, both by hand. The feed being very bad, it came up but thin. However, he sowed the other two pounds in the beginning of June, upon about six rood of ground: this he mowed in the beginning of August; and at Michaelmas he planted

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Recom-
mended
by
Sir James
Caldwell.

THEORY. off the plants on about 20 rood of ground, giving each plant a foot every way, and taking care not to bury the heart. These plants bore two crops of feed the year following; the first about the middle of June, the second about the middle of September; but the June crop was the best. The year after, it grew very rank, and produced two crops of feed, both very good. As it ought not to be cut after September, he let it stand till the next year; when it sheltered itself, and grew very well during all the winter, except when there was a hard frost; and even during the frost it continued green, though it was not perceived to grow. In the March following it covered the ground very well, and was fit to receive cattle.

If the winter is not remarkably severe, the burnet, though cut in September, will be 18 inches long in March; and it may be fed from the beginning of February till May: if the cattle are taken off in May, there will be a good crop of feed in the beginning of July. Five weeks after the cattle are taken off, it may be removed, if that is preferred to its standing for feed; it grows at the rate of an inch a-day, and is made into hay like other grass. It may be mown three times in one summer, and should be cut just before it begins to flower. Six rood of ground has produced 1150 pounds at the first cutting of the third year after it was sowed; and, in autumn 1763, Rocque sold no less than 300 bushels of the feed.

According to Rocque, the soil in which burnet flourishes best is a dry gravel; the longest drought never hurts it: and Sir James Caldwell asserts, that he saw a very vigorous and exuberant plant of this kind, growing from between two bricks in a wall in Rocque's ground, without any communication with the soil; for he had cut away all the fibres of the root that had stretched downward, and penetrated the earth, long before.

Burnet was found equally fit for feeding cows, sheep, and horses; but the sheep must not be suffered to crop it too close. Though no feed was left among the hay, yet it proved nourishing food; and Rocque kept a horse upon nothing else, who, at the time of writing the account, was in good heart, and looked well. He affirmed also, that it cured horses of the distemper called the *grease*, and that by its means he cured one which was thought incurable; but says it is only the first crop which has this effect.

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Burnet reckoned an improper food by Mr Miller and Mr Anderson.

This is the substance of Sir James Caldwell's letter to the Dublin society, at least as to what regards the culture of burnet; and it might reasonably be expected, that a plant, whose use was recommended to the public with so much parade, would soon have come into universal esteem. We were surprised, therefore, on looking into Mr Miller's Dictionary, to find the following words, under the article *Poterium*:—"This plant has of late been recommended by persons of little skill, to be sown as a winter pabulum for cattle: but whoever will give themselves the trouble to examine the grounds where it naturally grows, will find the plants left uneaten by the cattle, when the grass about them has been cropped to the roots; besides, in wet winters, and in strong land, the plants are of short duration, and therefore very unfit for that purpose: nor is the produce sufficient to tempt any person of skill to engage in its culture; therefore I wish those persons to make trial of it in small quantities, before they embark largely in

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these new schemes."—Mr Anderson, too, in his *Essays on Agriculture*, mentions the produce of burnet being so small, as not to be worth cultivating.

Upon the authority of Mr Rocque, likewise, the white beet is recommended as a most excellent food for cows; that it vegetates during the whole winter, consequently is very forward in the spring; and that the most profitable way of feeding cows is, to mow this herb, and give it to them green all the summer. It grew in Rocque's garden, during a very great drought, no less than four feet high, from the 30th of May to the 3^d of July; which is no more than one month and four days. In summer it grows more than an inch a-day, and is best sown in March: a bushel is enough for an acre, and will not cost more than 10 shillings. It thrives best in a rich, deep, light soil: the stalks are very thick and succulent; the cows should therefore eat them green.

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White beet recommended.

In Mr Anderson's essays, we find it recommended to make trial of some kinds of grasses, which probably would not only answer for fresh fodder during the winter, but might also be cut for hay in summer. This is particularly the case with that species called *sheep's fescue-grass*. "I had," (says he) "a small patch of this grass in winter 1773; which, having been cut in the month of August or September preceding, was saved from that period, and had advanced before winter to the length of five or six inches; forming the closest pile that could be imagined. And although we had about six weeks of very intense frost, with snow; and about other six weeks, immediately succeeding that, of exceeding keen frost every night, with frequent thaws in the day-time without any snow, during which time almost every green thing was destroyed; yet this little patch continued all along to retain as fine a verdure as any meadow in the month of May; hardly a point of a leaf having been withered by the uncommon severity of the weather. And as this grass begins to vegetate very early in the spring, I leave the reader to judge what might be the value of a field of grass of this kind in these circumstances."

53
Purple fescue.

Of another kind of grass, called *purple fescue*, Mr Anderson gives the following character. "It retained its verdure much better than rye-grass during the winter-season; but it had more of its points killed by the weather than the former. It likewise rises in the spring, at least as early as rye-grass."

This ingenious farmer has also made experiments on the culture of these and several other kinds of grasses; which being very well worthy of attention, we shall here insert.

1. *Purple fescue-grass*. "Although this grass is very often found in old pastures, yet as it has but few flower-stalks, and as it is greedily eat by all domestic animals, these are seldom suffered to appear; so that it usually remains there unperceived. But it seems to be better able to endure the peculiar acrimony of the dung of dogs than almost any other plant; and is therefore often to be met with in *dog-hills*, as I call the little hills by road-sides where dogs usually piss and dung: and as it is allowed to grow there undisturbed, the farmer may have an opportunity of examining the plant, and becoming acquainted with its appearance.

"The leaves are long and small, and appear to be roundish, something like a wire; but, upon examination,

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THEORY. tion, they are found not to be tubulated like a reed or rush; the sides of the leaf being only folded together from the middle rib, exactly like the strong bent-grass on the sea-shore. The flower-stalk is small, and branches out in the head, a little resembling the wild-oat; only the grains are much smaller, and the ear does not spread full open, but lies bending a little to one side. The stalks are often spotted with reddish freckles, and the tops of the roots are usually tinged with the same colour; from whence it has probably obtained its distinctive name of *fescua rubra*, or red (purple) *fescue*.

"It is often to be met with in old garden-walks; and, as its leaves advance very quickly after cuttings, it may usually be discovered above the other grasses, about a week or fortnight after the walks are cut. Nor do they seem to advance only at one season, and then stop and decay, like the rye-grass; but continue to advance during the whole of the summer, even where they are not cut; so that they sometimes attain a very great length. Last season, (1774,) I measured a leaf of this grass, that sprung up in a neglected corner, which was four feet and four inches in length, although not thicker than a small wire. It is unnecessary to add, that these leaves naturally trail upon the ground, unless where they meet with some accidental support; and that if any quantity of it is suffered to grow for a whole season, without being cut down or cut, the roots of the leaves are almost rotted, by the overshadowing of the tops of the other leaves, before the end of the season.

53
Appearance
in its culti-
vated state.

"This is the appearance and condition of the plant in its native situation: as it is seldom that it is discovered but in pretty old pastures, and as in that state it carries only a very few seed-stalks, it was with some difficulty that I could collect a small handful of the seed, which I carefully sowed in a small patch of garden-mould, to try if it could be easily cultivated. It came up as quickly as any other kind of grass, but was at first as small as hairs: the leaves, however, advanced apace; and were, before autumn, when the grain with which they had been sowed was cut down, about 16 or 18 inches in length: but having been sown very thin, it was necessary to pick out some other kinds of grass that came up amongst it, lest it might have been choked by them. Early next spring it advanced with prodigious vigour, and the tufts that were formed from every seed became exceeding large; so that it quickly filled the whole ground. But now the leaves were almost as broad as those of common rye-grass, and the two sides only inclined a little towards one another from the mid-rib, without any appearance of roundness. In due time a great many seed-stalks sprung out, which attained very nearly to the height of four feet, and produced seeds in abundance; which may be as easily sowed as those of common rye-grass.

"The prodigious difference between this plant in its native and cultivated state amazed me; but it was with a good deal of satisfaction that I found there would be no difficulty of procuring seeds from it, which I had much doubted of at first. It would seem, that nature hath endowed this plant with a strong generative power during its youth, which it gradually loses as it advances in age, (for the difference perceived in this case could not be attributed to the richness of the soil); and that, on the contrary, when it was old, the leaves advanced with an additional vigour, in proportion to

the declining strength of the flower-stalks: for the leaves of the young plant seldom exceed two feet, whereas numbers of the old leaves were near four feet in length.

"From these peculiarities in the growth of this plant, it would seem to promise to be of great use to the farmer; as he could reap from a field of it, for the first two or three years, as great a weight of hay as he could obtain from any of the culmiferous grasses, (those bearing a long jointed stalk); and, if he meant afterwards to pasture it, he would suffer no inconveniences from the flower-stalks; and the succulent leaves that continue to vegetate during the whole summer, would at all times furnish his cattle with abundance of wholesome food. It has also been remarked, that this grass rises as early in the spring as rye-grass; and continues green for the greatest part of winter, which the other does not. It is moreover an abiding plant, as it seems never to wear out of the ground where it has once been established. On all which accounts, it appears to me highly to merit the attention of the farmer; and well deserves to have its several qualities, and the culture that best agrees with it, ascertained by accurate experiments.

2. "*Sheeps fescue-grass*, or *fescua ovina*, is much praised by the Swedish naturalists for its singular value as a pasture-grass for sheep; this animal being represented as fonder of it than of any other grass, and fattening upon it more quickly than on any other kind of food whatever. And indeed, the general appearance of the plant, and its peculiar manner of growth, seems very much to favour the accounts that have been given of it.

54
Sheeps fescue described.

"This plant is of the same family with the former, and agrees with it in several respects; although they may be easily distinguished from one another. Its leaves, like the former, in its natural state, are always rounded, but much smaller; being little bigger than large horse-hairs, or swines-bristles, and seldom exceed six or seven inches in length. But these spring out of the root in tufts, so close upon one another, that they resemble, in this respect, a close hair-brush more than any thing else I know: so that it would seem naturally adapted to form that thick short pile of grass in which sheep are known chiefly to delight. Its flower-stalks are numerous, and sometimes attain the height of two feet; but are more usually about 12 or 15 inches high.

"Upon gathering the seeds of this plant, and sowing them as the former, it was found that they sprung up as quickly as any other kind of grass; but the leaves are at first no bigger than a human hair. From each side springs up one or two of these hair-like filaments, that in a short time send out new off-sets, so as quickly to form a sort of tuft, which grows larger and larger, till it at length attains a very large size, or till all the intervals are closed up, and then it forms the closest pile of grass that it is possible to imagine. In April and May it pushed forth an innumerable quantity of flower-stalks, that afforded an immense quantity of hay; it being so close throughout, that the scythe could scarcely penetrate it. This was allowed to stand till the seeds ripened; but the bottom of the stalks were quite blanched, and almost rotted for want of air before that time.

55
Its appearance when cultivated.

"This was the appearance that it made the first year after

THEORY. after it was sowed: but I have reason to think, that, after a few years, it likewise produces fewer seed-stalks, and a greater quantity of leaves than at first. But however that may be, it is certain, that if these are eat down in the spring, it does not, like rye-grass, persist in a continued tendency to run to seed; but is at once determined to push forth a quantity of leaves without almost any stalks at all: and as all domestic animals, but more especially sheep, are extremely fond of this grass, if they have liberty to pasture where it grows, they bite it so close as never to suffer almost a single seed-stalk to escape them; so that the botanist will often search in vain for it, when he is treading upon it with his feet. The best way to discover it in any pasture, is to search for it in winter, when the tufts of it may be easily distinguished from every other kind of grass, by their extraordinary closeness, and the deep green colour of the leaves.

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What soil
most proper

“It seems to grow in almost any soil; altho’ it is imagined that it would flourish best in a light sandy soil, as it can evidently live with less moisture than almost any other kind of grass; being often seen to remain in the fods that have been employed in coping for stone-dykes, after all the other grasses that grew in them have disappeared. It is likewise found in poor barren soils, where hardly any other plant can be made to grow at all; and on the surface of dry worn-out peat-moss, where no moisture remains, sufficient to support any other plant whatever: but in neither of these situations does it thrive; as it is there only a weak and unfightly plant, very unlike what it is when it has the good fortune to be established upon a good-soil; although it is seldom met with in this last state than in the former.

“I will not here repeat what has been already said about the particular property that this plant possesses of continuing all winter; nor point out the benefits that the farmer may reap from this valuable quality.—He need not, however, expect to find any verdure in winter on such plants as grow upon the loose mossy soil above-mentioned; for, as the frost in winter always hoves up the surface of this soil, the roots of the plants are so lacerated thereby, as to make it, for some time in the spring, to all appearance dead. Nor will he often perceive much verdure in winter upon those plants that grow upon poor hungry soils, which cannot afford abundant nourishment to keep them in a proper state of vegetation at all times: but such plants as grow on earthen dykes, which usually begin to vegetate with vigour when the autumnal rains come on, for the most part retain their verdure at that season almost as well as if they were in good garden-mould.

“I have been very particular in regard to this plant; because, in as far as my observations have yet gone, it promises on many accounts to make a most valuable acquisition to the farmer, and therefore justly demands a very particular share of his attention.”

57
Holcus lanatus.

3. The *holcus lanatus*, or creeping soft-grass of Hudson.—This is considered by our author as one of the most valuable kinds of meadow-grasses; its pile being exceedingly close, soft, and succulent. It delights much in moisture, and is seldom found on dry ground, unless the soil is exceeding rich. It is often found on those patches near springs, over which the water frequently flows; and may be known by the uncommon softness and succulence of the blade, the lively light

green colour of the leaves, and the matted intertexture of its roots. But, notwithstanding the softness of its first leaves, when the seed-stalks advance, they are rough to the touch, so that the plant then assumes a very different appearance from what we would have expected. The ear is branched out into a great number of fine ramifications somewhat like the oat, but much smaller.—This kind of grass, however, would not be easily cultivated, on account of a kind of soft membrane that makes the seeds adhere to the stalk, and to one another, after they are separated from it, as if they were intermixed with cobweb, so that it is difficult to get them separated from the stalk, or to spread readily in sowing. It spreads, however, so fast by its running roots, that a small quantity sowed very thin, would be sufficient to stock a large field in a short time.

These are the kinds of *grasses*, properly so called, which have not as yet been cultivated, that Mr Anderson thinks the most likely to be of value; but, besides these, he recommends the following, of the peat-tribe.

1. *Milk-vetch*, *liquorice-vetch*, or *milkwort*. This **THEORY.** plant, in some respects, very much resembles the common white clover; from the top of the root a great number of shoots come out in the spring, spreading along the surface of the ground every way around it; from which arise a great many clusters of bright yellow flowers, exactly resembling those of the common broom. These are succeeded by hard round pods, filled with small kidney-shaped seeds. From a supposed resemblance of a cluster of these pods to the fingers of an open hand, the plant has been sometimes called *ladies-fingers*. By others it is called *cow-toes*, from a fancied resemblance of the pods to the toes of a bird. Others, from the appearance of the blossom, and the part where the plant is found, have called it *scal*, improperly *fell-broom*. It is found plentifully almost every where in old grass-fields; but as every species of domestic animal eats it, almost in preference to any other plant, it is seldom allowed to come to the flower in pasture-grounds, unless where they have been accidentally saved from the cattle for some time; so that it is only about the borders of corn-fields, or the sides of inclosures to which cattle have not access, that we have an opportunity of observing it. As it has been imagined that the cows which feed on these pastures, where this plant abounds, yield a quantity of rich milk, the plant has, from that circumstance, obtained its most proper English name of *milk-vetch*.

One of the greatest recommendations of this plant **59** is, that it grows in poor barren ground, where almost ^{Its good qualities.} no other plant can live. It has been observed in ground so poor, that even heath, or ling, (*Erica Communis*) would scarcely grow; and upon bare obdurate clays, where no other plant could be made to vegetate; inasmuch that the surface remained entirely uncovered, unless where a plant of this kind chanced to be established; yet even in these unfavourable circumstances, it flourished with an uncommon degree of luxuriance, and yielded as tender and succulent, though not such abundant shoots, as if reared in the richest manured fields. In dry, barren sands also, where almost no other plant could be made to live, it has been found to send out such a number of healthy shoots all round, as to cover the earth with the closest and most beautiful

THEORY. carpet that can be desired.

The stalks of the milk-vetch are weak and slender, so that they spread upon the surface of the ground, unless they are supported by some other vegetable. In ordinary soils they do not grow to a great length, nor produce many flowers; but in richer fields the stalks grow to a much greater length, branch out a good deal, but carry few or no flowers or seeds. From these qualities our author did not attempt at first to cultivate it with any other view than that of pasture; and, with this intention, sowed it with his ordinary hay-seeds, expecting no material benefit from it till he desisted from cutting his field. In this, however, he was agreeably disappointed; the milk-vetch growing, the first season, as tall as his great clover, and forming exceeding fine hay; being scarce distinguishable from lucerne, but by the slenderness of the stalk, and proportional smallness of the leaf.

Another recommendation to this plant is, that it is perennial. It is several years after it is sowed before it attains to its full perfection; but, when once established, it probably remains for a great number of years in full vigour, and produces annually a great quantity of fodder. In autumn 1773, Mr Anderson cut the stalk from an old plant that grew on a very indifferent soil; and after having thoroughly dried it, he found that it weighed 14 ounces and an half.

The stalks of this plant die down entirely in winter, and do not come up in the spring till the same time that clover begins to advance; nor does it advance very fast, even in summer, when once cut down or cut over: so that it seems much inferior to the above-mentioned grasses; but might be of use to cover the worst parts of a farm, on which no other vegetable could thrive.

⁶²
Yellow
vetchling.

2. The common yellow vetchling, *latyrus pratensis*, or *everlasting tare*, grows with great luxuriance in stiff clay soils, and continues to yield annually a great weight of fodder, of the very best quality, for any length of time. This is equally fit for pasture, or hay; and grows with equal vigour in the end of summer, as in the beginning of it; so would admit being pastured upon in the spring, till the middle, or even the end of May, without endangering the loss of the crop of hay. This is an advantage which no other plant except clover possesses; but clover is equally unfit for early pasture, or for hay. Sain-foin is the only plant whose qualities approach to it in this respect, and the yellow vetchling will grow in such soils as are utterly unfit for producing sain-foin.—It is also a perennial plant; and increases so fast by its running roots, that a small quantity of the seed would produce a sufficient number of plants to fill a whole field in a very short time. If a small patch of good ground is sowed with the seeds of this plant in rows, about a foot distance from one another, and the intervals kept clear of weeds for that season, the roots will spread so much as to fill up the whole patch next year; when the stalks may be cut for green fodder or hay. And if that patch were dug over in the spring following, and the roots taken out, it would furnish a great quantity of plants, which might be planted at two or three feet distance from one another, where they would probably overspread the whole field in a short time.

⁶³
Blue tare.

3. The common blue tare, seems more likely than

the former to produce a more nourishing kind of hay, ^{THEORY.} as it abounds much more in feeds; but as the stalks come up more thinly from the root, and branch more above, it does not appear to be so well adapted for a pasture-grass as the other. The leaves of this plant are much smaller, and more divided, than those of the other; the stalks are likewise smaller, and grow to a much greater length. Though it produces a great quantity of feeds, yet the small birds are so fond of them, that, unless the field was carefully guarded, few of them would be allowed to ripen.

4. The *vicia sepium*, purple *everlasting*, or *buff-vetch*. ⁶² Buff-vetch. Our author gives the preference to this plant beyond all others of the same tribe for pasture. The roots of it spread on every side a little below the surface of the ground, from which, in the spring, many stems arise quite close by one another; and as these have a broad tufted top covered with many leaves, it forms as close a pile as could be desired. It grows very quickly after being cut or cropt, but does not arrive at any great height; so that it seems more proper for pasture than making hay; altho', upon a good soil, it will grow sufficiently high for that purpose; but the stalks grow so close upon one another, that there is great danger of having it rotted at the root, if the season should prove damp. It seems to thrive best in a clay soil.

Besides these, there are a variety of others of the same class, which he thinks might be useful to the farmer. ⁶³ Everlasting pea. The common garden everlasting pea, cultivated as a flowering plant, he conjectures, would yield a prodigious weight of hay upon an acre; as it grows to the height of ten or twelve feet, having very strong stalks, that could support themselves without rotting, till they attained a great height.

One other plant, hitherto unnoticed, is recommended by our author to the attention of the farmer; it is the common yarrow, *achillea millefolium*, or hundred-leaved grass. Concerning this plant, he remarks, that, in almost every fine old pasture, a great proportion of the growing vegetables with which the field is covered, consists of it; but the animals which feed there are so fond of the yarrow, as never to allow one feed-stalk of it to come to perfection. Hence these feed-stalks are never found but in neglected corners, or by the sides of roads; and are so disagreeable to cattle, that they are never tasted; and thus it has been erroneously thought that the whole plant was refused by them.—The leaves of this plant have a great tendency to grow very thick upon one another, and are therefore peculiarly adapted for pasture. It arrives at its greatest perfection in rich fields that are naturally fit for producing a large and succulent crop of grass. It grows also upon clays; and is among the first plants that strike root in any barren clay, that has been lately dug from any considerable depth; so that this plant, and thistles, are usually the first that appear on the banks of deep ditches formed in a clayey soil. All animals delight to eat it; but, from the dry aromatic taste it possesses, it would seem peculiarly favourable to the constitution of sheep. It seems altogether unfit for hay.

Besides these plants, which are natives of our own country, there are others, which, though natives of a foreign climate, are found to thrive very well in Britain; and have been raised with such success by individuals, as highly to merit the attention of every farmer. ⁶⁴ Lucerne.

THEORY. mer. Among these the first place is claimed by lucerne.

This plant hath a perennial root, and annual stalks, which, in good soil, rise to three feet; or sometimes more in height; but for a particular description of the whole plant, see the article *MEDICA*. All sorts of domestic cattle are fond of this plant, especially when allowed to eat it green, and black cattle may be fed very well with the hay made from it; but an excess of this food is said to be very dangerous.

Lucerne has the property of growing very quickly after it is cut down, inasmuch that Mr Rocque has mowed it five times in a season, and Mr Anderson affirms he has cut it no less than six times. It is, however, not very easily cultivated; in consequence of which it sometimes does not succeed; and as it dies entirely in the winter, it is perhaps inferior to the fescue grasses already mentioned, which, tho' despised and neglected, might probably yield as rich a crop as lucerne, without any danger of a miscarriage.

66
Timothy-
grass.

Another grass was brought from Virginia, where it is a native, and sown by Rocque in 1763. This grass is called *Timothy*, from its being brought from New-York to Carolina by one Timothy Hanfon. It grows best in a wet soil; but will thrive in almost any. If it is sown in August, it will be fit for cutting in the latter end of May or beginning of June. Horses are very fond of it, and will leave lucerne to eat it. It is also preferred by black cattle and sheep; for a square piece of land having been divided into four equal parts, and one part sowed with lucerne, another with fain-foin, a third with clover, and the fourth with timothy, some horses, black cattle, and sheep, were turned into it, when the plants were all in a condition for pasturage; and the timothy was eaten quite bare, before the clover, lucerne, or fain-foin, was touched.

One valuable property of this grass is, that its roots are so strong and interwoven with one another, that they render the wettest and softest land, on which a horse could not find footing, firm enough to bear the heaviest cart. With the view of improving boggy lands, therefore, so as to prevent their being poached with the feet of cattle, Mr Anderson recommends the cultivation of this kind of grass, from which he has little expectation in other respects.

SECT. VII. Of the Diseases of Plants.

THESE are divided by Tournefort into the following classes. 1. Those which arise from too great an abundance of juice; 2. from having too little; 3. From its bad qualities; 4. From its unequal distribution; and 5. From external accidents.

Too great an abundance of juices causes at first a prodigious luxuriant growth of the vegetable; so that it does not come to the requisite perfection in a due time. Wheat is subject, in some climates, to a disease of this kind; it vegetates excessively, without ever carrying ripe grain; and the same disease may be artificially produced in any grain, by planting it in too rich a soil. Too much rain is apt likewise to do the same. When a vegetable is supplied too abundantly with juices, it is very apt to rot; one part of it overshadowing another in such a manner as to prevent the access of fresh air; upon which, putrefaction soon ensues, as has been already observed with regard to the fescue grasses.

In grass, or any herbaceous plant, where the leaves

are only wanted, this over-luxuriancy cannot be called a disease, but is a very defensible property; but in any kind of grain, it is quite otherwise. Dr Home, in his *Principles of Agriculture and Vegetation*, classeth the *smut* in grain among the diseases arising from this cause. He is of opinion, that too great an abundance of juices in a vegetable will produce diseases similar to those occasioned by repletion in animal-bodies; viz. stagnations, corruptions, varices, carities, &c. along with the too great luxuriancy we have just now mentioned, which he expresses by "too great an abundance of water-shoots." Hence he is induced to class the *smut* among diseases arising from this cause; it being a corruption happening most in rainy seasons, and to weak grain.—Like other contagious diseases, he tells us, the *smut* may be communicated from the infected to healthy grain. As a preventative, he recommends steeping the grain in a strong pickle of sea-salt. Besides the effect which this has upon the grain itself, it is useful for separating the good from the bad; the best seed falling to the bottom, and the faulty swimming on the top of the liquor.—For the same purpose, a ley of wood-ashes and quicklime is recommended by some; and, by others, a solution of salt-petre or copperas; after which the grain is to be dried with slacked lime, or dry turf-ashes. This solution, however, we can by no means recommend, as it seems most likely to kill the grain entirely.

According to Dr Home, dung is a preventative of diseases arising from too great moisture; in confirmation of which, he relates the following experiment. "Two acres of poor ground, which had never got any manure, were fallowed with a design to be sown with wheat; but the scheme being altered, some dung was laid on a small part of it, and the whole sowed, after it had got five furrows, with barley. A great quantity of rain fell. The barley on that part which was dunged, was very good; but what was on the rest of the field turned yellow after the rains, and, when ripe, was not worth the reaping."

The want of nourishment in plants may be easily known by their decay; in which case, the only remedy is, to supply them with food, according to the methods we have already directed; or to remove from their neighbourhood such other plants as may draw off the nourishment from those we wish to cultivate.—In the *Memoirs of the Academy of Sciences for 1728*, Mr Du Hamel mentions a disease, which he calls *le mort*, that attacks saffron in the spring. It is owing to another plant, a species of trefail, fixing some violet-coloured threads, which are its roots, to the roots of the saffron, and sucking out its juice. This disease is prevented by digging a trench, which saves all the unaffected.

The bad qualities, or unequal distributions, of the juices of plants, are the occasion of so few of the diseases to which vegetables in this country are subject, that we forbear to mention them at present. Most of the diseases of our plants are owing to external accidents, particularly to the depredations of insects.—The insects by which the greatest devastations are committed in this country are, snails, caterpillars, grubs, and flies. The snails and caterpillars feed on the leaves and young shoots; by which means they often totally destroy the vegetable. Where the plants are of easy access, these vermin may be destroyed by sprinkling the vegetable with lime-water, for quick-lime is a mortal poison to crea-

THEORY.

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67
Effects of
too great an
abundance
of juices.

68
Smut in
grass.

THEORY.

tures of this kind, and throws them into the greatest agonies the moment they are touched with it. On trees, however, where this method cannot so well be followed, fumigation is the most proper; and, for this purpose, nothing is better than the smoke of vegetables not perfectly dry. In some cases the eggs of these destroying creatures may be observed, and ought without doubt immediately to be taken away. On the fruit-trees, as apples, pears, medlars, on some forest-trees, the oak and dwarf-maple especially, and the white and black thorn in hedges, a kind of little tufts are to be observed, resembling, at first sight, withered leaves twisted, by a cobweb, about the uppermost twigs or branches. These contain a vast number of little black eggs, that in the spring produce swarms of caterpillars which devour every thing. To prevent this, all the twigs on which these cobwebs appear should be taken off and burnt as soon as possible. This ought to be done before the end of March, that none of the eggs be allowed sufficient time for hatching.

74
Grubs.

The grubs are a kind of worms which destroy the corn by feeding upon its roots; they are transformed every fourth year into the beetles called *cock-chafers*, *may-bugs*, &c. they are very destructive when in their vermicular state, and cannot then be destroyed because they go deep in the ground. When become beetles, they conceal themselves under the leaves of trees, where they seem asleep till near sunset, when they take their flight. It is only now that they can be destroyed, and that by a very laborious method; namely, by spreading pack-sheets below the trees in the day-time when the beetles are in their torpid state, then shaking them off and burning them. Some time ago, they made such devastations in the county of Norfolk, that several farmers were entirely ruined by them; one gathered 80 bushels of these insects from the trees which grew on

his farm. It is said that, in 1574 there fell such a multitude of these insects into the river Severn, that they stopped and clogged the wheels of the water-mills.

Turnips, when young, are apt to be totally destroyed by a multitude of little black flies, from thence called the *turnip-fly*. As a preventative of these, some advise the seed to be mixed with brimstone; but this is improper, as brimstone is found to be poisonous to vegetables. The best method seems to be the fumigation of the fields with smoke of half-dried vegetables. For this purpose weeds will answer as well as any. This fumigation must no doubt be often repeated, in order to drive away the innumerable multitudes of these insects which are capable of destroying a large field of turnip.

75
Turnip-fly.

Some time ago an insect, called the *corn-butterfly*, committed such ravages while in its vermicular state, in France, that upwards of 200 parishes were ruined by it; and the ministry offered a reward to the discoverer of an effectual remedy against this destroying worm. The cure which was at last discovered, was to heat the corn, in an oven, so much as not to destroy its vegetative power, but sufficiently to destroy the small worms, which made their nest in the substance of the grain, and at last eat out the substance so completely that nothing could be got from the husk, even by boiling it in water. It is certain, that though insects can bear a great deal of cold, they are easily destroyed by a slight degree of heat; nor is the vegetative power of corn easily destroyed, even when kept for a long time in a pretty strong heat. This method must therefore be very effectual for destroying all kinds of insects with which grain is apt to be infected: but care must be taken not to apply too great a heat; and the adjusting of the precise degree necessary to destroy the insect, without hurting the corn, will be attended with some difficulty.

76
Corn butterfly.

PART II. PRACTICE OF AGRICULTURE.

SECT. I. Instruments of Husbandry.

THE instruments employed in agriculture are various; as the plough, the harrow, the roller, &c. which are again greatly diversified by differences arising from their construction, and particular uses.

I. OF PLOUGHS.

THE plough constructed in the following manner is still the most common and the most generally understood in Scotland; and, if properly made, is the best for answering all purposes, when only one is used; though others are, perhaps, more proper on some particular occasions.

78
Description of the Scotch plough.

The parts of which this plough is composed, are the head, the beam, the sheath, the wrest, the mould-board, the two handles, the two rungs, the sock, and the coulter; the two last are made of iron, and all the rest of wood.

Plate IV.
fig. 1.

The HEAD, is designed for opening the ground below. The length of the head from A to B is about 20 inches, and the breadth from A to D about five inches; C is the point upon which the sock is driven, and the length from B to C is about six inches; *a* is the mortoise into which the larger handle is fixed, and *b* is the mortoise into which the sheath is fixed.

The head is that part of the plough which goes in

the ground; therefore the shorter and narrower it is, the friction will be the less, and the plough more easily drawn; but the longer the head is, the plough goes more steadily, and is not so easily put out of its direction by any obstructions that occur. Twenty inches is considered as a mean length; and five inches as the most convenient breadth.

The SHEATH, E, is driven into the mortoise *b*, and Fig. 2. thus fixed to the head A B. It is not perpendicular to the head, but placed obliquely, so as to make the angle formed by the lines A B and E B about 60 degrees. The sheath is about 13 inches long, besides what is driven into the mortoise *b*; about three inches broad, and Fig. 1. one inch thick.

The sheath is fixed to the mould-board, as in fig. 11. E, in the same manner as the wrest is fixed to the head in fig. 7.

The MOULD-BOARD, is designed to turn over the earth of the furrow made by the plough; and it is obvious, that, according to the position of the sheath, the mould-board will turn over the earth of the furrow more or less suddenly. Besides, when it forms a less angle with the head than 60 degrees, the plough is in great danger of being choked, as the farmers term it.

The Larger HANDLE, F A, is fixed to the head, by Fig. 3. driving it into the mortoise *a*. It is placed in the same Fig. 1. plane

PRACTICE plane with the head; and its length from A F is about five feet four inches, and its diameter at the place where it is fixed to the beam is about two inches and an half, and tapers a little to the top F. About ten inches from A, there is a curve in the handle, which, when F is raised to its proper height, makes the lower part of it nearly parallel to the sheath E B. This curve is designed to strengthen the handle. The proper position of the handle is, when the top F is about three feet two inches higher than the bottom of the head A B.

Fig. 3.

The longer the handles, the plough is the more easily managed, because the levers are more distant from the centre of motion. The higher the top of the handles, the plough is more easily raised out of the ground, provided they be no higher than the lower part of a man's breast.

Fig. 4.

The BEAM, is fixed to the larger handle and the sheath, all of which are placed in the same plane with the head. The length of it, from H to I, is about six feet; its diameter is about four inches. When the plough is in the ground, the beam should be just high enough not to be incommoded by any thing on the surface.

Fig. 5.

The position of the beam depends on the number of cattle in the plough. When two horses are yoked, the beam should be placed in such a manner as to make the perpendicular distance betwixt the bolt-hole of the beam and the plane of the head about 21 inches; when four horses are yoked, two a-breast, this distance should only be about 18 inches.

Fig. 6.

The SOCK, B P, is fixed to the end of the head, and is about two feet long. In fitting the sock to the head, the point ought to be turned a little to the land or left side; because otherwise it is apt to come out of the land altogether. When turned to the left, it likewise takes off more land; when turned upwards, the plough goes shallow; and when downwards, it goes deeper.

Fig. 7.

The COULTER, is fixed to the beam, and is about two feet ten inches long, two inches and a half broad, sharp at the point and before, and thick on the back, like a knife. It is fixed and directed by wedges, so as to make the point of it equal to, or rather a little before the point of the sock, and upon a line with the left side of the head. This oblique position enables it to throw roots, &c. out of the land, which requires less force than cutting or pushing them forward.

The WREST, B D, is fixed to the head, and is about 26 inches long, two broad, and one thick. It is fixed to the head at B, in such a manner as to make the angle contained between the lines A B and B D about 25 degrees. The wrest is seldom or never placed in the same plane with the head, but gradually raised from the place where it is fixed to it; that is, from B to K, as in fig. 8. The position of the wrest determines the nature of the furrow. When the wrest is wide and low set, the furrow is wide; and when it is narrow and high set, the furrow is narrow.

Fig. 9. represents the two HANDLES, fixed together by the two rungs. The larger handle has already been described; the lesser one is a few inches shorter, and does not require to be quite so strong. The distance of the handles at the little rung depends on the position of the wrest. Their distance at M and P is about two feet six inches. The lesser handle is fixed to the mould board at M, fig 10. and to the wrest K B, at L.

Fig 11. represents the plough complete, by joining together figures 6. and 10. in the sheath E B. The wrest B K is supposed to make an angle with the head A B as in fig. 7. and the handles joined together as in fig. 9.

After having given such a particular description of all the parts and proportions of the Scots plough, it will easily appear how it separates, raises, and turns over the earth of the furrow. If it had no coulter, the earth would open above the middle of the sock, and in a line before the sheath; but as the coulter opens the earth in a line with the left side of the head, if the soil has any cohesion, the earth of the furrow will be wholly raised from the left side, and, as the sock moves forward, will be thrown on the right side of the sheath, and by the casting out of the mould-board, or the raising of the wrest, will be turned over.

The BRIDLE, or MUZZLE, is another article belonging to the plough. It is fixed to the end of the beam, and the cattle are yoked by it. The muzzle commonly used is a curved piece of iron, fixed to the beam by a bolt through it. A B C is the muzzle, A C the bolt by which it is fixed to the beam; D is the fswingle-tree or cross-tree, to which the traces are fixed; and B is a hook, or cleek, as it is commonly called, which joins the muzzle and fswingle-tree.

Fig. 12.

Some use another kind of muzzle, A B C D. It is fixed to the beam by two bolts, and has notches by which the cleek of the fswingle-tree may be fixed either to the right or the left of the beam. There are also different holes for the hind-bolt to pass thro', by which the draught may be fixed either above or below the beam. A D is the fore-bolt upon which the muzzle turns; on B C are four notches, betwixt any two of which the cleek of the fswingle-tree may be fixed. When the cleek is fixed at B, the plough is turned towards the firm land, and takes off a broader furrow; and when fixed at C, it is turned towards the ploughed land, and takes of a narrower furrow. E and F are the holes on each side thro' which the hindmost bolt passes. When the bolt is put thro' the highest two, these holes being thereby brought to the middle of the beam, the fore-part of the muzzle is raised above the beam, and the plough is made to go deeper; and when put through the lowest two, the fore-part of the muzzle is sunk below the beam, and the plough is made to go shallower. This muzzle may be so constructed as to have the same play with the common one. A is the end of the beam; B a plate of iron sunk into it, and, with a similar one in the other side, is rivetted into it by bolts; C is the muzzle fixed to these plates of iron by the bolt D, which bolt may be put through any of the holes E E. From the construction of this muzzle it is plain, that it has the same play with the common one, and that by it the land of the plough may be altered at pleasure.

Fig. 10.

Of all forms, that of the Scotch plough is the fittest for breaking up stiff and rough land, especially where stones abound; and no less fit for strong clays hardened by drought. The length of its head gives it a firm hold of the ground; its weight prevents it from being thrown out by stones; the length of the handles gives the ploughman great command to direct its motion; and by the length of its head, and of its mould-board, it lays the furrow-slice cleverly over. This plough

79
Properties
of the Scots
plough.

PRACTICE

80
In what soil
improper.

plough was contrived during the infancy of agriculture, and was well contrived: in the soils above described, it has not an equal.

But in tender soil it is improper, because it adds greatly to the expence of ploughing, without any counterbalancing benefit. The length of the head and mould-board increases the friction, and consequently it requires a greater number of oxen or horses than are necessary in a shorter plough. There is another particular in its form, that refits the draught: the mould-board makes an angle with the sock, instead of making a line with it gently curving backward. There is an objection against it no less solid, that it does not stir the ground perfectly: the hinder part of the wreat rises a foot above the sole of the head; and the earth that lies immediately below that hinder part, is left unfurrowed. This is ribbling land below the surface, similar to what is done by ignorant farmers on the surface.

These defects must be submitted to in a soil that requires a strong heavy plough; but may be avoided in a cultivated soil by a plough differently constructed. Of all the ploughs fitted for a cultivated soil free of stones, that introduced into Scotland about 12 years ago, by James Small in Blackadder Mount, Berwickshire, is the best. It is now in great request; and with reason, as it avoids all the defects of the Scotch plough. The shortness of its head and of its mouldboard lessen the friction greatly: from the point of the sock to the back part of the head it is only 30 inches; and the whole length, from the point of the beam to the end of the handles, between eight and nine feet. The sock and mouldboard make one line gently curving; and consequently gather no earth. Instead of a wreat, the under edge of the mouldboard is in one plain with the sole of the head; which makes a wide furrow, without leaving any part unfurrowed. It is termed the *chain-plough*, because it is drawn by an iron chain fixed to the back part of the beam immediately before the coulter. This has two advantages: first, by means of a muzzle, it makes the plough go deep, or shallow; and, next, it stresses the beam less than if fixed to the point, and therefore a slenderer beam is sufficient.

This plough may well be considered as a capital improvement; not only by saving expence, but by making better work. It is proper for loams; for carle-clays; and, in general, for every sort of tender soil free of stones. It is even proper for opening up pasture-ground, where the soil has been formerly well cultivated.

A spiked sock is used in the Scotch plough. The difference between it and the feathered sock will be best understood by comparing their figures. Fig. 14. is the common sock, and fig. 15. the feathered one.

From the construction of the feathered sock, it is obvious, that it must meet with greater resistance than the common sock. However, when the plough takes off the earth of the furrow broader than that part of the sock which goes upon the head, it is more easily drawn than the plough with the common sock; for the earth which the common sock leaves to be opened by the wreat, is more easily opened by the feather of the other sock. In sea, the feathered sock makes the plough go more easily, because the roots of the grass, which go beyond the reach of the plough, are more easily cut by the feather, than they can be torn asunder

by the common sock. The feathered sock is also of great use in cutting and destroying root-weeds. The common sock, however, answers much better in strong land.

It is proper here to add, that in fitting the feathered sock to the head, the point of it should be turned a little from the land, or a little to the right hand.

Some ploughs are made with two small wheels running in the furrow, in order to take off the friction of the head; and this plough is recommended in a book, intitled, *The complete Farmer*. But all complicated ploughs are babbles; and this as much as any. The pivots of such wheels are always going wrong; and, besides, they are choked so with earth, as to increase the friction instead of diminishing it.

If we look back 30 years, ploughs of different constructions did not enter even into a dream. The Scotch plough was universally used; and no other was known. There was no less ignorance as to the number of cattle necessary for this plough. In the south of Scotland, six oxen and two horses were universal; and in the north, 10 oxen, sometimes 12. The first attempt to lessen the number of oxen, was in Berwickshire. The low part of that county abounds with stone, clay, and marl, the most substantial of all manures, which had been long used by one or two gentlemen. About 25 years ago it acquired reputation, and spread rapidly. As two horses and two oxen were employed in every marl-cart; the farmer, in summer-fallowing, and in preparing land for marl, was confined to four oxen and two horses. And as that manure afforded plenty of succulent straw for oxen, the farmer was surprised to find that four oxen did better now than six formerly. Marling, however, a laborious work, proceeded slowly, till people were taught by a noted farmer in that country, what industry can perform by means of power properly applied. It was reckoned a mighty task to marl five or six acres in a year. That gentleman, by plenty of red clover for his working-cattle, accomplished the marling 50 acres in a summer, once 54. Having so much occasion for oxen, he tried with success two oxen and two horses in a plough; and that practice became general in Berwickshire.

Now here appears with lustre the advantage of the chain-plough. The great friction occasioned in the Scotch plough by a long head, and by the angle it makes with the mould-board, necessarily requires two oxen and two horses, whatever the soil be. The friction is so much less in the chain-plough, that two good horses are found sufficient in every soil that is proper for it. Besides, the reducing the draught to a couple of horses has another advantage, that of rendering a driver unnecessary. This saving on every plough, where two horses and two oxen were formerly used, will, by the strictest computation, be £ 15 sterling yearly; and where four horses were used, no less than £ 20 sterling. There is now scarce to be seen in the low country of Berwickshire a plough with more than two horses; which undoubtedly in time will become general. We know but of one further improvement, that of using two oxen instead of two horses. That draught has been employed with success in several places; and the saving is so great, that it must force its way every where. It may be confidently affirmed, no soil stirred in a proper season, can ever require more than two horses

83
Wheel-
plough-

84
Ignorance of
farmers in
Scotland but
a few years
ago.

80
Chain-
plough.
Plate V.
fig. 1.

82
Of the Sock.
Plate IV.

85
Advantages
of the chain-
plough particu-
larly illu-
strated.



Fig. 2.



Fig. 3.

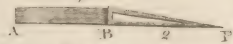


Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.

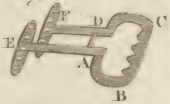


Fig. 11.

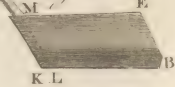


Fig. 12.



Fig. 13.



Fig. 14.

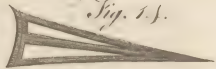


Fig. 15.

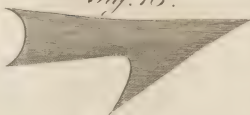
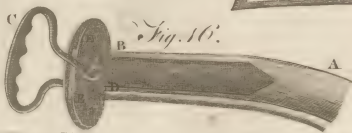


Fig. 16.





PRACTICE

horses and two oxen, in a plough, even supposing the stiffest clay. In all other soils, two good horses, or two good oxen abreast, may be relied on for every operation of the chain-plough.

A chain-plough of a smaller size than ordinary, drawn by a single horse, is of all the most proper for horse-hoeing, supposing the land to be mellow, which it ought to be for that operation. It is sufficient for making furrows to receive the dung, for ploughing the drills after dunging, and for hoeing the crop.

86
A small
single-horse
plough re-
commended
for various
purposes.

A still smaller plough of the same kind may be recommended for a kitchen-garden. It can be reduced to the smallest size, by being made of iron; and where the land is properly dressed for a kitchen-garden, an iron plough drawn by a horse of the smallest size will save much spade-work.—In Scotland, thirty years ago, a kitchen-garden was an article of luxury merely, because at that time there could be no cheaper food than oatmeal. At present, the farmer maintains his servants at double expence, as the price of oatmeal is doubled; and yet he has no notion of a kitchen-garden, more than he had thirty years ago. He never thinks, that living partly on cabbage, kail, turnip, carrot, would save much oatmeal: nor does he ever think, that change of food is more wholesome, than vegetables alone, or oatmeal alone. We need not recommend potatoes, which in scanty crops of corn have proved a great blessing: without them, the labouring poor would frequently have been reduced to a starving condition. Would the farmer but cultivate his kitchen-garden with as much industry as he bestows on his potatoe-crop, he needed never fear want; and he can cultivate it with the iron plough at a very small expence. It may be held by a boy of 12 or 13; and would be a proper education for a ploughman. But it is the landlord who ought to give a beginning to the improvement. A very small expence would inclose an acre for a kitchen-garden to each of his tenants; and it would excite their industry, to bestow an iron plough on those who do best.

Nor is this the only case where a single-horse plough may be profitably employed. It is sufficient for seed-furrowing barley, where the land is light and well-dressed. It may be used in the second or third ploughing of fallow, to encourage annual weeds, which are destroyed in subsequent ploughings.

2. The BRAKE.

The brake is a large and weighty harrow, the purpose of which is to reduce a stubborn soil, where an ordinary harrow makes little impression. It consists of four square bulls, each five inches, and six feet and a half in length. The teeth are 17 inches long, bending forward like a coulters. Four of them are inserted into each bull, fixed above with a screw-nut, having 12 inches free below, with a heel close to the under part of the bull, to prevent it from being pushed back by stones. The nut above makes it easy to be taken out for sharpening. This brake requires four horses or four oxen. One of a lesser size will not fully answer the purpose: one of a larger size will require six oxen; in which case the work may be performed at less expence by the plough.

This instrument may be applied to great advantage

Vol. I.

88
Uses.

87
Brake de-
scribed.
Plate V.
fig. 2.

in the following circumstances. In the following strong clay that requires frequent ploughings, a braking between every ploughing will pulverize the soil, and render the subsequent ploughings more easy. In the month of March or April, when strong ground is ploughed for barley, especially if bound with couch-grass, a cross braking is preferable to a cross-ploughing, and is done at half the expence. When ground is ploughed from the state of nature, and after a competent time is cross-ploughed, the brake is applied with great success, immediately after the cross-ploughing, to reduce the whole to proper tilth.

Let it be observed, that a brake with a greater number of teeth than above-mentioned, is improper for ground that is bound together by the roots of plants, which is always the case of ground new broken up from its natural state. The brake is soon choked, and can do no execution till freed from the earth it holds. A less number of teeth would be deficient in pulverizing the soil.

3. The HARROW.

HARROWS are commonly considered as of no use but to cover the seed. But they have another use scarce less essential, which is to prepare land for the seed. This is an article of importance for producing a good crop. But how imperfectly either of these purposes is performed by the common harrow, will appear from the following account of it.

The harrow commonly used is of different forms. The first we shall mention has two bulls, four feet long and 18 inches asunder, with four wooden teeth in each. A second has three bulls and 12 wooden teeth. A third has four bulls, and 20 teeth, of wood or iron, 10, 11, or 12 inches asunder. Now, in fine mould, the last may be sufficient for covering the seed; but none of them are sufficient to prepare for the seed any ground that requires subduing. The only tolerable form is that with iron teeth; and the bare description of its imperfections will shew the necessity of a more perfect form. In the first place, this harrow is by far too light for ground new taken up from the state of nature, for clays hardened with spring-drought, or for other stubborn soils: it floats on the surface; and after frequent returns in the same track, nothing is done effectually. In the next place, the teeth are too thick set, by which the harrow is apt to be choked, especially where the earth is bound with roots, which is commonly the case. At the same time, the lightness and number of teeth keep the harrow upon the surface, and prevent one of its capital purposes, that of dividing the soil. Nor will fewer teeth answer for covering the seed properly. In the third place, the teeth are too short for reducing a coarse soil to proper tilth; and yet it would be in vain to make them longer, because the harrow is too light for going deep into the ground. Further, the common harrows are so ill constructed, as to ride at every turn one upon another. Much time is lost in disengaging them. Lastly, it is equally unfit for extirpating weeds. The ground is frequently so bound with couch-grass, as to make the furrow-lice stand upright, as when old lea is ploughed: notwithstanding much labour, the grass-roots keep the field, and gain the victory.

A little reflection, even without experience, will make

T

make

PRACTICE

89
Imperfection of the
common
harrow.

PRACTICE

PRACTICE

90
Improved
harrow.Plate V.
fig. 3.

make it evident, that the same harrows, whatever be the form, can never answer all the different purposes of harrowing, nor can operate equally in all different soils, rough or smooth, firm or loose. The following, therefore, have been recommended; which are of three different forms, adapted for different purposes. They are all of the same weight, drawn each by two horses. Birch is the best wood for them, because it is cheap, and not apt to split. The first is composed of four bulls, each four feet ten inches long, three and a quarter inches broad, and three and a half deep; the interval between the bulls 11 and three-fourths inches; so that the breadth of the whole harrow is four feet. The bulls are connected by four fleths, which go thro' each bull, and are fixed by timber-nails driven through both. In each bull five teeth are inserted, ten inches free under the bull, and ten inches asunder. They are of the same form with those of the brake, and inserted into the wood in the same manner. Each of these teeth is three pounds weight; and where the harrow is made of birch, the weight of the whole is six stone 14 pounds Dutch. An erect bridle is fixed at a corner of the harrow, three inches high, with four notches for drawing higher or lower. To this bridle a double tree is fixed for two horses drawing abreast, as in a plough. And to strengthen the harrow, a flat rod of iron is nailed upon the harrow from corner to corner in the line of the draught.

Fig. 4.

The second harrow consists of two parts, connected together by a crank or hinge in the middle, and two chains of equal length, one at each end, which keep the two parts always parallel, and at the same distance from each other. The crank is so contrived, as to allow the two parts to ply to the ground like two unconnected harrows; but neither of them to rise above the other, more than if they were a single harrow without a joint. In a word, they may form an angle downward, but not upward. Thus they have the effect of two harrows in curved ground, and of one weighty harrow in a plain. This harrow is composed of six bulls, each four feet long, three inches broad, and three and a half deep. The interval between the bulls nine and a half inches; which makes the breadth of the whole harrow, including the length of the crank, to be five feet five inches. Each bull has five teeth, nine inches free under the wood, and ten inches asunder. The weight of each tooth is two pounds; the rest as in the former.

Fig. 5.

The third consists also of two parts, connected together like that last mentioned. It has eight bulls, each four feet long, two and a half inches broad, and three deep. The interval between the bulls is eight inches; and the breadth of the whole harrow, including the length of the crank, is six feet four inches. In each bull are inserted five teeth, seven inches free under the wood, and ten and a half inches asunder, each tooth weighing one pound. The rest as in the two former harrows.

91
Properties
of these har-
rows.

These harrows are a considerable improvement. They ply to curved ground like two unconnected harrows; and when drawn in a plain, they are in effect one harrow of double weight, which makes the teeth pierce deep into the ground. The imperfection of common harrows, mentioned above, will suggest the advantages of the set of harrows here recommended. The first is pro-

per for harrowing land that has lain long after ploughing, as where oats are sown on a winter-furrow, and in general for harrowing stiff land: it pierces deep into the soil by its long teeth, and divides it minutely. The second is intended for covering the seed: its long teeth lays the seed deeper than the common harrow can do; which is no slight advantage. By placing the seed considerably under the surface, the young plants are, on the one hand, protected from too much heat, and, on the other, have sufficiency of moisture. At the same time, the seed is so well covered that none of it is lost. Seed slightly covered by the common harrows, wants moisture, and is burnt up by the sun; beside, that a proportion of it is left upon the surface uncovered. The third harrow supplies what may be deficient in the second, by smoothing the surface, and covering the seed more accurately. The three harrows make the ground finer and finer, as heckles do lint; or, to use a different comparison, the first harrow makes the bed, the second lays the seed in it, the third smooths the cloaths. They have another advantage not inferior to any mentioned: they mix manure with the soil more intimately than can be done by common harrows; and upon such intimate mixture depends greatly the effect of manure, as has already been explained. To conclude, these harrows are contrived to answer an established principle in agriculture, That fertility depends greatly on pulverizing the soil, and on an intimate mixture of manure with it, whether dung, lime, marl, or any other.

4. The ROLLER.

The roller is an instrument of capital use in husbandry, tho' scarcely known in ordinary practice; and, where introduced, it is commonly so slight as to have very little effect.

92
The roller.

Rollers are of different kinds; stone, yetling, wood. Each of these has its advantages. We would recommend the last, constructed in the following manner. Take the body of a tree, six feet ten inches long, the larger the better, made as near a perfect cylinder as possible. Surround this cylinder with three rows of filices, one row in the middle, and one at each end. Line these fillices with planks of wood equally long with the roller, and so narrow as to ply into a circle. Bind them fast together with iron rings. Beech-wood is the best, being hard and tough. The roller thus mounted, ought to have a diameter of three feet ten inches. It has a double pair of shafts for two horses abreast. These are sufficient in level ground: in ground not level, four horses may be necessary. The roller without the shafts ought to weigh two hundred stone Dutch; and the large diameter makes this great weight easy to be drawn.

Rolling wheat in the month of April, is an important article in loose soil; as the winter-rains preling down the foil leave many roots in the air. Barley ought to be rolled immediately after the feed is sown; especially where grafs-seeds are sown with it. The best time for rolling a gravelly foil, is as soon as the mould is so dry as to bear the roller without clinging to it. A clay foil ought neither to be tilled, harrowed, nor rolled, till the field be perfectly dry. And as rolling a clay foil is chiefly intended for smoothing the surface, a dry season may be patiently waited for, even

93
Season for
rolling.

till

till the crop be three inches high. There is the greater reason for this precaution, because much rain immediately after rolling is apt to cake the surface when drought follows. Oats in a light soil may be rolled immediately after the seed is sown, unless the ground be so wet as to cling to the roller. In a clay soil, delay rolling till the grain be above ground. The proper time for sowing grafs-seeds in an oat-field, is when the grain is three inches high; and rolling should immediately succeed, whatever the soil be. Flax ought to be rolled immediately after sowing. This should never be neglected; for it makes the seed push equally, and prevents after-growth, the bad effect of which is visible in every step of the process for dressing flax. The first year's crop of sown grasses ought to be rolled as early the next spring as the ground will bear the horses. It fixes all the roots precisely as in the case of wheat. Rolling the second and third crops in loose soil is an useful work; though not so essential as rolling the first crop.

94
Effects of
rolling.

In the first place, rolling renders a loose soil more compact and solid; which encourages the growth of plants, by making the earth clap close to every part of every root. Nor need we be afraid of rendering the soil too compact; for no roller that can be drawn by two or four horses will have that effect. In the next place, rolling keeps in the moisture, and hinders drought to penetrate. This effect is of great moment. In a dry season, it may make the difference of a good crop, or no crop, especially where the soil is light. In the third place, the rolling grafs-seeds, beside the foregoing advantages, facilitates the moving for hay; and it is to be hoped, that the advantage of this practice will lead farmers to mow their corn also, which will increase the quantity of straw, both for food and for the dunghill.

There is a small roller for breaking clods in land intended for barley. The common way is, to break clods with a mell; which requires many hands, and is a laborious work. This roller performs the work more effectually, and at much less expense: let a harrowing precede, which will break the clods a little; and after lying a day, or a day and a half to dry, this roller will dissolve them into powder. This however does not supercede the use of the great roller after all the other articles are finished, in order to make the soil compact, and to keep out the summer-drought. A stone roller four feet long, and fifteen inches diameter, drawn by one horse, is sufficient to break clods that are easily dissolved by pressure. The use of this roller in preparing land for barley is gaining ground daily, even among ordinary tenants, who have become sensible both of the expense and toil of using wooden mells. But in a clay soil, the clods are sometimes too firm, or too tough, to be subdued by so light a machine. In that case, a roller of the same size, but of a different construction, is necessary. It ought to be surrounded with circles of iron, six inches asunder, and seven inches deep; which will cut even the most stubborn clods, and reduce them to powder. Let not this instrument be considered as a finical refinement. In a stiff clay, it may make the difference of a plentiful or scanty crop.

5. The FANNER.

This instrument for winnowing corn was introduced into Scotland not many years ago. Formerly wind being our only resource, the winnowing of corn was no less precarious than the grinding it at a wind-mill: people often were reduced to famine in the midst of plenty. There was another bad effect: it was necessary to place a barn open to the west wind, however irregular or inconvenient the situation might be with regard to the other buildings. But it is needless to be particular upon that useful instrument; because every farmer considers it now as no less essential than a plough or a harrow.

95
The fanner.

SECT. II. Preparing Land for Cropping.

I. OBSTRUCTIONS TO CROPPING.

In preparing land for cropping, the first thing that occurs, is to consider the obstructions to regular ploughing. The most formidable of these, are *stones* lying above or below the surface, which are an impediment to a plough, as rocks are to a ship. Stones above the surface may be avoided by the ploughman, though not without loss of ground; but stones below the surface are commonly not discovered till the plough be flattered to pieces, and perhaps a day's work lost. The clearing land of stones is therefore necessary to prevent mischief. And to encourage the operation, it is attended with much actual profit. In the first place, the stones are useful for fences: when large they must be blown, and commonly fall into parts proper for building. And as the blowing, when gunpowder is furnished, does not exceed a halfpenny for each inch that is bored, these stones come generally cheaper than to dig as many out of the quarry. In the next place, as the soil round a large stone is commonly the best in the field, it is purchased at a low rate by taking out the stone. Nor is this a trifle; for not only is the ground lost that is occupied by a large stone, but also a considerable space round it, to which the plough has not access without danger. A third advantage is greater than all the rest; which is, that the ploughing can be carried on with much expedition, when there is no apprehension of stones: in stony land, the plough must proceed so slow, as not to perform half of its work.

96
Obstructions, viz.
97
Stones.

To clear land of stones, is in many instances an undertaking too expensive for a tenant who has not a very long lease. As it is profitable both to him and to his landlord, it appears reasonable that the work should be divided, where the lease exceeds not nineteen years. It falls naturally upon the landlord to be at the expense of blowing the stones, and upon the tenant to carry them off the field.

Another obstruction is *wet ground*. Water may improve gravelly or sandy soils; but it fours (A) a clay soil, and converts low ground into a morass, unfit for any purpose that can interest the husbandman.

A great deal has been written upon different methods of draining land, mostly so expensive as to be scarce fit for the landlord, not to mention the tenant.

98
Wetness.

T 2

One

(A) By this expression it is not meant that the ground really becomes acid, but only that it becomes unfit for the purposes of vegetation. The natural products of such a soil are rushes, and *four grafts*: which last appears in the furrows, but seldom in the crown of the ridge; is dry, and tasteless, like a chip of wood; and feels rough when stroked backwards.

One way of draining without expence when land is to be inclosed with hedge and ditch, is to direct the ditches so as to carry off the water. But this method is not always practicable, even where the divisions lie convenient for it. If the run of water be considerable, it will destroy the ditches, and lay open the fences, especially where the soil is loose or sandy.

If ditches will not answer, hollow drains are sometimes made, and sometimes open drains, which must be made so deep as to command the water. The former is filled up with loose stones, with brush-wood, or with any other porous matter that permits the water to pass. The latter is left open, and not filled up. To make the former effectual, the ground must have such a slope as to give the water a brisk course. To execute them in level ground is a gross error: the passages are soon stopped up with sand and sediment, and the work is rendered useless. This inconvenience takes not place in open drains; but they are subject to other inconveniences: They are always filling up, to make a yearly reparation necessary; and they obstruct both ploughing and pasturing.

The following is the best in all views. It is an open drain made with the plough, clearing the space intended for the drain over and over, till the furrow be made of a sufficient depth for carrying off the water. The slope on either side may, by repeated ploughings, be made so gentle as to give no obstruction either to the plough or to the harrow. There is no occasion for a spade, unless to smooth the sides of the drain, and to remove accidental obstructions in the bottom. The advantages of this drain are manifold. It is executed at much less expence than either of the former; and it is perpetual, as it never can be obstructed. In level ground, it is true, grass may grow at the bottom of the drain; but to clear off the grass once in four or five years, will restore it to its original perfection. A hollow drain may be proper between the spring-head and the main drain, where the distance is not great; but in every other case the drain recommended is the best.

Where a level field is infested with water from higher ground, the water ought to be intercepted by a ditch carried along the foot of the high ground, and terminating in some capital drain.

The only way to clear a field of water that is hollow in the middle, is to carry it off by some drain still lower. This is commonly the case of a morass fed with water from higher ground, and kept on the surface by a clay bottom.

A clay soil of any thickness is never pestered with springs; but it is pestered with rain, which settles on the surface as in a cup. The only remedy is high narrow ridges, well rounded. And to clear the furrows, the furrow of the foot-ridge ought to be considerably lower, in order to carry off the water cleverly. It cannot be made too low, as nothing hurts clay soil more than the stagnation of water on it; witness the hollows at the end of crooked ridges, which are absolutely barren. Some gravelly soils have a clay bottom; which is a substantial benefit to a field when in grass, as it retains moisture. But when in tillage, ridges are necessary to prevent rain from settling at the bottom; and this is the only case where a gravelly soil ought to be ridged.

Clay soils that have little or no level, have sometimes

a gravelly bottom. For discharging the water, the best method is, at the end of every ridge to pierce down to the gravel, which will absorb the water. But if the furrow of the foot-ridge be low enough to receive all the water, it will be more expeditious to make a few holes in that furrow. In some cases, a field may be drained, by filling up the hollows with earth taken from higher ground. But as this method is expensive, it will only be taken where no other method answers. Where a field happens to be partly wet, partly dry, there ought to be a separation by a middle ridge, if it can be done conveniently. And the dry part may be ploughed, while the other is drying.

The low part of Berwickshire is generally a brick clay extremely wet and poachy during winter. This in a good measure may be prevented by proper inclosing, as there is not a field but can be drained into lower ground, all the way down to the river Tweed. But as this would lessen the quantity of rain in a dry climate, such as is all the east-side of Britain, it may admit of some doubt whether the remedy would not be as bad as the disease. (*See the article DRAINING.*)

2. Bringing into CULTURE, LAND from the STATE OF NATURE.

To improve a moor, let it be opened in winter when it is wet; which has one convenience, that the plough cannot be employed at any other work. In spring, after frost is over, a slight harrowing will fill up the seams with mould, to keep out the air, and rot the sod. In that state let it lie the following summer and winter, which will rot the sod more than if laid open to the air by ploughing. Next April, let it be cross-ploughed, braked, and harrowed, till it be sufficiently pulverized. Let the manure laid upon it, whether lime or dung, be intimately mixed with the soil by repeated harrowings. This will make a fine bed for turnip-feed if sown broad-cast. But if drills be intended, the method must be followed that is directed afterward in treating more directly of the culture of turnip.

A successful turnip-crop, fed on the ground with sheep, is a fine preparation for laying down a field with grass-seeds. It is an improvement upon this method, to take two or three successive crops of turnip, which will require no dung for the second and following crops. This will thicken the soil, and enrich it greatly.

The best way of improving swampy ground after draining, is paring and burning. But where the ground is dry, and the soil so thin as that the surface cannot be pared, the best way of bringing it into tillth from the state of nature, as mentioned above, is to plough it with a feathered sock, laying the grassy surface under. After the new surface is mellowed with frost, fill up all the seams by harrowing cross the field, which by excluding the air will effectually rot the sod. In this state let it lie summer and winter. In the beginning of May after, a cross-ploughing will reduce all to small square pieces, which must be pulverized with the brake, and make it ready for a May or June crop. If these square pieces be allowed to lie long in the sap without breaking, they will become tough and not be easily reduced.

3. FORMING RIDGES.

THE first thing that occurs on this head, is to con- OF ridges, sider

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Moorish ground.

100
Swampy ground.

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Of ridges.

PRACTICE sider what grounds ought to be formed into ridges, and what ought to be tilled with a flat surface. Dry soils, which suffer by lack of moisture, ought to be tilled flat, which tends to retain moisture. And the method for such tillings, is to go round and round from the circumference to the centre, or from the centre to the circumference. This method is advantageous in point of expedition, as the whole is finished without once turning the plough. At the same time, every inch of the soil is moved, instead of leaving either the crown or the furrow unmoved, as is commonly done in tilling ridges. Clay soil, which suffers by water standing on it, ought to be laid as dry as possible by proper ridges. A loamy soil is the middle between the two mentioned. It ought to be tilled flat in a dry country, especially if it incline to the soil first mentioned. In a moist country, it ought to be formed into ridges, high or low according to the degree of moisture and tendency to clay.

In grounds that require ridging, an error prevails, that ridges cannot be raised too high. High ridges labour under several disadvantages. The soil is heaped upon the crown, leaving the furrows bare: the crown is too dry, and the furrows too wet: the crop, which is always best on the crown, is more readily shaken with the wind, than where the whole crop is of an equal height: the half of the ridge is always covered from the sun, a disadvantage which is far from being slight in a cold climate. High ridges labour under another disadvantage in ground that has no more level than barely sufficient to carry off water: they sink the furrows below the level of the ground; and consequently retain water at the end of every ridge. The furrows ought never to be sunk below the level of the ground. Water will more effectually be carried off, by lessening the ridges both in height and breadth: a narrow ridge, the crown of which is but 18 inches higher than the furrow, has a greater slope than a very broad ridge where the difference is three or four feet.

Next, of forming ridges where the ground hangs considerably. Ridges may be too steep as well as too horizontal; and if to the ridges be given all the steepness of a field, a heavy shower may do irreparable mischief. To prevent such mischief, the ridges ought to be so directed cross the field, as to have a gentle slope for carrying off water slowly, and no more. In that respect, a hanging field has greatly the advantage of one that is nearly horizontal; because in the latter, there is no opportunity of a choice in forming the ridges. A hill is of all the best adapted for directing the ridges properly. If the soil be gravelly, it may be ploughed round and round, beginning at the bottom and ascending gradually to the top in a spiral line. This method of ploughing a hill, requires no more force than ploughing on a level; and at the same time removes the great inconvenience of a gravelly hill, that rains go off too quickly; for the rain is retained in every furrow. If the soil be such as to require ridges, they may be directed to any slope that is proper.

In order to form a field into ridges, that has not been formerly cultivated, the rules mentioned are easily put in execution. But what if ridges be already formed, that are either crooked or too high? After seeing the advantage of forming a field into ridges, people were naturally led into an error, that the higher the better.

But what could tempt them to make their ridges crooked? Certainly this method did not originate from design; but from the laziness of the driver suffering the cattle to turn too hastily, instead of making them finish the ridge without turning. There is more than one disadvantage in this slovenly practice. First, the water is kept in by the curve at the end of every ridge, and fours the ground. Next, as a plough has the least friction possible in a straight line, the friction must be increased in a curve, the back part of the mouldboard pressing hard on the one hand, and the coulter pressing hard on the other. In the third place, the plough moving in a straight line, has the greatest command in laying the earth over. But where the straight line of the plough is applied to the curvature of a ridge in order to heighten it by gathering, the earth moved by the plough is continually falling back, in spite of the most skilful ploughman.

The inconveniences of ridges high and crooked are so many, that one would be tempted to apply a remedy at any risk. And yet, if the soil be clay, it would not be advisable for a tenant to apply the remedy upon a lease shorter than two nineteen years. In a dry gravelly soil, the work is not difficult, nor hazardous. When the ridges are cleaved two or three years successively in the course of cropping, the operation ought to be concluded in one summer. The earth, by reiterated ploughings, should be accumulated upon the furrows, so as to raise them higher than the crowns: they cannot be raised too high, for the accumulated earth will subside by its own weight. Cross-ploughing once or twice, will reduce the ground to a flat surface, and give opportunity to form ridges at will. The same method brings down ridges in clay soil: only let care be taken to carry on the work with expedition; because a hearty shower, before the new ridges are formed, would soak the ground in water, and make the farmer suspend his work for the remainder of that year at least. In a strong clay, we would not venture to alter the ridges, unless it can be done to perfection in one season.—On this subject Mr Anderfon has the following observations *.

“The difficulty of performing this operation properly with the common implements of husbandry, and the obvious benefit that accrues to the farmer from having his fields level, has produced many new inventions of ploughs, harrows, drags, &c. calculated for speedily reducing the fields to that state; none of which have as yet been found fully to answer the purpose for which they were intended, as they all indiscriminately carry the earth that was on the high places into those that were lower; which, although it may, in some cases, render the surface of the ground tolerably smooth and level, is usually attended with inconveniences far greater, for a considerable length of time, than that which it was intended to remove.

“For experience sufficiently shows, that even the best vegetable mould, if buried for any length of time so far beneath the surface as to be deprived of the benign influences of the atmosphere, loses its *vis vite*, if I may be allowed that expression; becomes an inert, lifeless mass, little fitted for nourishing vegetables; and constitutes a soil very improper for the purposes of the farmer. It therefore behoves him, as much as in him lies, to preserve, on every part of his fields, an equal covering

* *Essays on Agriculture*, Vol. I. p. 146.

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Inconveniences in the common methods of levelling.

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Vegetable mould becomes inert by being long buried.

PRACTICE

covering of that vegetable mould that has long been uppermost, and rendered fertile by the meliorating influence of the atmosphere. But, if he suddenly levels his high ridges by any of these mechanical contrivances, he of necessity buries all the good mould that was on the top of the ridges, in the old furrows; by which he greatly impoverishes one part of his field, while he too much enriches another; inasmuch that it is a matter of great difficulty, for many years thereafter, to get the field brought to an equal degree of fertility in different places; which makes it impossible for the farmer to get an equal crop over the whole of his field by any management whatever: and he has the mortification frequently, by this means, to see the one half of his crop rotted by an over-luxuriance, while other parts of it are weak and sickly, or one part ripe and ready for reaping, while the other is not properly filled; so that it were, on many occasions, better for him to have his whole field reduced at once to the same degree of poorness as the poorest of it, than have it in this state. An almost impracticable degree of attention in spreading the manures may indeed in some measure get the better of this; but it is so difficult to perform this properly, that I have frequently seen fields that had been thus levelled, in which, after thirty years of continued culture and repeated dressings, the marks of the old ridges could be distinctly traced when the corn was growing, altho' the surface was so level that no traces of them could be perceived when the corn was off the ground.

"But this is a degree of perfection in levelling that cannot be usually attained by following this mode of practice; and, therefore, is but seldom seen. For all that can be expected to be done by any levelling machine, is to render the surface perfectly smooth and even in every part, at the time that the operation is performed: but as, in this case, the old hollows are suddenly filled up with loose mould to a great depth, while the earth below the surface upon the heights of the old ridges remain firm and compact, the new-raised earth after a short time subsides very much, while the other parts of the field do not sink at all; so that, in a short time, the old furrows come to be again below the level of the other parts of the field, and the water of course is suffered in some degree to stagnate upon them; in so much that, in a few years, it becomes necessary once more to repeat the same levelling process, and thus renew the damage that the farmer sustains by this pernicious operation.

"On these accounts, if the farmer has not a long lease, it will be found in general to be much his interest to leave the ridges as he found them, rather than to attempt to alter their direction: and, if he attends with due caution to moderate the height of these old ridges, he may reap very good crops, although perhaps at a somewhat greater expence of labour than he would have been put to upon the same field, if it had been reduced to a proper level surface, and divided into straight and parallel ridges.

"But, where a man is secure of possessing his ground for any considerable length of time, the advantages that he will reap from having level and well laid-out fields, are so considerable as to be worth purchasing, if it should even be at a considerable expence. But the loss that is sustained at the beginning, by this mecha-

nical mode of levelling ridges, if they are of considerable height, is so very great, that it is perhaps doubtful if any future advantages can ever fully compensate it. I would therefore advise, that all this levelling apparatus should be laid aside; and the following more efficacious practice be substituted in its stead: A practice that I have long followed with success, and can safely recommend as the very best that has yet come to my knowledge.

"If the ridges have been raised to a very great height, as a preparation for the ensuing operations, they may be first *cleven*, or *scaled* out, as it is called in different places; that is, ploughed so as to lay the earth on each ridge from the middle towards the furrows. But, if they are only of a moderate degree of height, this operation may be omitted. When you mean to proceed to level the ground, let a number of men be collected, with spades, more or fewer as the nature of the ground requires, and then set a plough to draw a furrow directly across the ridges of the whole field intended to be levelled. Divide this line into as many parts as you have labourers, allotting to each one ridge or two, or more or less, according to their number, height, and other circumstances. Let each of the labourers have orders, as soon as the plough has passed that part assigned him, to begin to dig in the bottom of the furrow that the plough has just made, about the middle of the side of the old ridge, keeping his face towards the old furrow, working backwards till he comes to the height of the ridge, and then turn towards the other furrow, and repeat the same on the other side of the ridge, always throwing the earth that he digs up into the deep old furrow between the ridges, that is directly before him; taking care not to dig deep where he first begins, but to go deeper and deeper as he advances to the height of the ridge, so as to leave the bottom of the trench he thus makes across the ridge entirely level, or as nearly so as possible. And when he has finished that part of the furrow allotted to him that the plough has made in going, let him then go and finish in the same manner his own portion of the furrow that the plough makes in returning. In this manner, each man performs his own task through the whole field, gradually raising the old furrows as the old heights are depressed. And, if an attentive overseer is at hand, to see that the whole is equally well done, and that each furrow is raised to a greater height than the middle of the old ridges, so as to allow for the subsiding of that loose earth, the operation will be entirely finished at once, and never again need to be repeated.

"In performing this operation, it will always be proper to make the ridges, formed for the purpose of levelling, which go across the old ridges, as broad as possible; because the deep trench that is thus made in each of the furrows are an impediment in the future operations, as well as the height that is accumulated in the middle of each of these ridges; so that the fewer there are of these, the better it is. The farmer, therefore, will do well to advert to this in time, and begin by forming a ridge by always turning the plough to the right hand, till it becomes of such a breadth as makes it very inconvenient to turn longer in that manner; and then, at the distance of twice the breadth of this new-formed ridge from the middle of it, mark off

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Levelling
sometimes
not to be
attempted.

PRACTICE a furrow for the middle of another ridge, turning round it to the right hand, in the same manner as was done in the former, till it becomes of the same breadth with it; and then, turning to the left hand, plough out the interval that was left between the two new-formed ridges. By this mode of ploughing, each ridge may be made of 40, or 50 or 60 yards in breadth, without any great inconvenience; for, although some time will be lost in turning at the ends of these broad ridges, yet, as this operation is only to be once performed in this manner, the advantage that is reaped by having few open furrows, is more than sufficient to counterbalance it. And, in order to moderate the height that would be formed in the middle of each of these great ridges, it will always be proper to mark out the ridges, and draw the furrow that is to be the middle of each, some days before you collect your labourers to level the field; that you may, without any hurry or loss of labour, clear out a good trench through the middle of each of the old ridges; as the plough at this time going and returning nearly in the same track, prevents the labourers from working properly without this precaution.

"If these rules are attended to, your field will be at once reduced to a proper level, and the rich earth that formed the surface of the old ridges be still kept upon the surface of your field; so that the only loss that the possessor of such ground can sustain by this operation, is merely the expence of performing it."

He afterwards makes a calculation of the different expences of levelling by the plough and by the spade, in which he finds the latter by far the cheapest method.

¹⁰⁶ Proper direction of the ridges.
Let it be a rule, to direct the ridges north and south, if the ground will permit. In this direction, the east and west sides of the ridges, dividing the sun equally between them, will ripen at the same time.

¹⁰⁷ Narrow ridges an advantage.
It is a great advantage in agriculture, to form ridges so narrow, and so low, as to admit the crowns and furrows to be changed alternately every crop. The soil nearest the surface is the best; and by such ploughing, it is always kept near the surface, and never buried. In high ridges, the soil is accumulated at the crown and the furrows left bare. Such alteration of crown and furrow, is easy where the ridges are no more but seven or eight feet broad. This mode of ploughing answers perfectly well in sandy and gravelly soils, and even in loam. But it is not safe in clay soil. In that soil, the ridges ought to be 12 feet wide, and 20 inches high; to be preserved always in the same form by casting, that is, by ploughing two ridges together, beginning at the furrow that separates them, and ploughing round and round till the two ridges be finished. By this method, the separating furrow is raised a little higher than the furrows that bound the two ridges. But at the next ploughing, that inequality is corrected, by beginning at the bounding furrows, and going round and round till the ploughing of the two ridges be completed at the separating furrow.

4. CLEARING GROUND OF WEEDS.

¹⁰⁸ Cleaning harrow.
Plate V. fig. 6.
For this purpose a new instrument, termed a *cleaning harrow*, has been introduced by Lord Kaimes, and is strongly recommended (B.) It is one entire piece like the first of those mentioned above, consisting of

PRACTICE seven bulls, four feet long each, two and one-fourth inches broad, two and three-fourths deep. The bulls are united together by sheths, similar to what are mentioned above. The intervals between the bulls being three and three-fourths inches, the breadth of the whole harrow is three feet five inches. In each bull are inserted eight teeth, each nine inches free below the wood, and distant from each other six inches. The weight of each tooth is a pound, or near it. The whole is firmly bound by an iron plate from corner to corner in the line of the draught. The rest as in the harrows mentioned above. The size, however, is not invariable. The cleaning harrow ought to be larger or less according as the soil is stiff or free.

To give this instrument its full effect, stones of such a size as not to pass freely between the teeth ought to be carried off, and clods of that size ought to be broken. The ground ought to be dry, which it commonly is in the month of May.

In preparing for barley, turnip, or other summer-crop, begin with ploughing and cross-ploughing. If the ground be not sufficiently pulverized, let the great brake be applied, to be followed successively with the 1st and 2^d harrows*. In stiff soil, rolling may be proper, * Plate V. or twice between the acts. These operations will loosen fig. 3, 4.

every root, and bring some of them to the surface. This is the time for the 3^d harrow†, conducted by a † Fig. 5.

boy mounted on one of the horses, who trots smartly along the field, and brings all the roots to the surface: there they are to lie for a day or two, till perfectly dry. If any stones or clods remain, they must be carried off in a cart. And now succeeds the operation of the cleaning harrow. It is drawn by a single horse, directed by reins, which the man at the opposite corner puts over his head, in order to have both hands free.

In this corner is fixed a rope, with which the man from time to time raises the harrow from the ground, to let the weeds drop. For the sake of expedition, the weeds ought to be dropped in a straight line cross the field, whether the harrow be full or not; and seldom is a field so dirty but that the harrow may go 30 yards before the teeth are filled. The weeds will be thus laid in parallel rows, like those of hay raked together for drying. A harrow may be drawn swiftly along the rows, in order to shake out all the dust; and then the weeds may be carried clean off the field in carts. But we are not yet done with these weeds: instead of burning, which is the ordinary practice, they may be converted into useful manure, by laying them in a heap with a mixture of hot dung to begin fermentation. At first view, this way of cleaning land will appear operose; but upon trial, neither the labour nor expence will be found immoderate. At any rate, the labour and expence ought not to be grudged; for if a field be once thoroughly cleaned, the seasons must be very cross, or the farmer very indolent, to make it necessary to renew the operation in less than 20 years. In the worst seasons, a few years pasture is always under command; which effectually destroys triennial plants, such as thistles and couch-grass.

SECT. III. Culture of particular Plants.

The articles hitherto insisted on, are all of them preparatory to the capital object of a farm, that of raising

(B) In his *Gentleman Farmer*; to which performance the practical part of this article is materially indebted.

PRACTICE raising plants for the nourishment of man, and of other animals. These are of two kinds; culmiferous, and leguminous; differing widely from each other. Wheat, rye, barley, oats, rye-grass, are of the first kind: of the other kind are peas, beans, clover, cabbage, and many others.

110 Culmiferous plants. Culmiferous plants, says Bonnet, have three sets of roots. The first issue from the seed, and push to the surface an upright stem; another set issue from a knot in that stem; and a third, from another knot, nearer the surface. Hence the advantage of laying seed so deep in the ground as to afford space for all the sets.

111 Leguminous plants. Leguminous plants form their roots differently. Peas, beans, cabbage, have store of small roots, all issuing from the seed, like the undermost set of culmiferous roots; and they have no other roots. A potatoe and a turnip have bulbous roots. Red clover has a strong tap-root. The difference between culmiferous and leguminous plants with respect to the effects they produce in the soil, will be insisted on afterward, in the section concerning rotation of crops. As the present section is confined to the propagation of plants, it falls naturally to be divided into three articles: first, Plants cultivated for fruit; second, Plants cultivated for roots; third, Plants cultivated for leaves.

I. Plants Cultivated for Fruit.

1. WHEAT and RYE.

112 Fallowing for wheat. ANY time from the middle of April to the middle of May, the fallowing for wheat may commence. The moment should be chosen, when the ground, beginning to dry, has yet some remaining softness: in that condition, the soil divides easily by the plough, and falls into small parts. This is an essential article, deserving the strictest attention of the farmer. Ground ploughed too wet, rises, as we say, *ubble-fur*, as when pasture-ground is ploughed: where ploughed too dry, it rises in great lumps, which are not reduced by subsequent ploughings; not to mention, that it requires double force to plough ground too dry, and that the plough is often broken to pieces. When the ground is in proper order, the farmer can have no excuse for delaying a single minute. This first course of fallow must, it is true, yield to the barley-feed; but as the barley-feed is commonly over the first week of May, or sooner, the season must be unfavourable if the fallow cannot be reached by the middle of May.

As clay soil requires high ridges, these ought to be cleaved at the first ploughing, beginning at the furrow, and ending at the crown. This ploughing ought to be as deep as the soil will admit: and water-furrowing ought instantly to follow; for if rain happen before water-furrowing, it stagnates in the furrow, necessarily delays the second ploughing till that part of the ridge be dry, and prevents the furrow from being mellowed and roasted by the sun. If this first ploughing be well executed, annual weeds will rise in plenty.

About the first week of June, the great brake will loosen and reduce the soil, encourage a second crop of annuals, and raise to the surface the roots of weeds moved by the plough. Give the weeds time to spring, which may be in two or three weeks. Then proceed to the second ploughing about the beginning of July; which must be crows the ridges, in order to reach all

the slips of the former ploughing. By crows-ploughing the furrows will be filled up, and water-furrowing be still more necessary than before. Employ the brake again about the 10th of August, to destroy the annuals that have sprung since the last stirring. The destruction of weeds is a capital article in following; yet so blind are people to their interest, that nothing is more common than a fallow field covered with charlock and wild mustard, all in flower, and ten or twelve inches high. The field having now received two harrowings and two breakings, is prepared for manure, whether lime or dung, which without delay ought to be incorporated with the soil, by a repeated harrowing and a gathering furrow. This ought to be about the beginning of September, and as soon after as you please the seed may be sown.

As in ploughing a clay soil it is of importance to prevent poaching, the hinting furrows ought to be done with two horses in a line. If four ploughs be employed in the same field, to one of them may be allotted the care of finishing the hinting furrows.

113 Dressing loam for wheat. Loam, being a medium between land and clay, is of all soils the fittest for culture, and the least subject to chances. It does not hold water like clay; and when wet, it dries sooner. At the same time, it is more retentive than sand of that degree of moisture which promotes vegetation. On the other hand, it is more subject to couch-grass than clay, and to other weeds; to destroy which, fallowing is still more necessary than in clay.

Beginning the fallow about the first of May, or as soon as barley-feed is over, take as deep a furrow as the soil will admit. Where the ridges are so low and narrow as that the crown and furrow can be changed alternately, there is little or no occasion for water-furrowing. Where the ridges are so high as to make it proper to cleave them, water-furrowing is proper. The second ploughing may be at the distance of five weeks. Two crops of annuals may be got in the interim, the first by the brake, and the next by the harrow; and by the same means eight crops may be got in the season. The ground must be cleared of couch-grass and knot-grass roots, by the cleaning harrow described above. The time for this operation is immediately before the manure is laid on. The ground, at that time being in its loosest state, parts with its grass-roots more freely than at any other time. After the manure is spread, and incorporated with the soil by braking or harrowing, the seed may be sown under furrow, if the ground hang so as easily to carry off the moisture. To leave it rough without harrowing, has two advantages: it is not apt to cake with moisture; and the inequalities make a sort of shelter to the young plants against frost. But if it lie flat, it ought to be smoothed with a slight harrow after the seed is sown, which will facilitate the course of the rain from the crown to the furrow.

114 A sandy soil is too loose for wheat. The only chance dressing a sandy soil. for a crop is after red clover, the roots of which bind the soil; and the instructions above given for loam are applicable here. Rye is a crop much fitter for sandy soil than wheat; and like wheat it is generally sown after a summer-fallow.

115 Lastly, Sow wheat as soon in the month of October as Time for the ground is ready. When sown a month more early, it sowing.

PRACTICE is too forward in the spring, and apt to be hurt by frost: when sown a month later, it has not time to root before frost comes on, and frost spews it out of the ground.

2. OATS.

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Effect of
frost upon
tilled land.

As winter-ploughing enters into the culture of oats, we must remind the reader of the effect of frost upon tilled land. Providence has neglected no region intended for the habitation of man. If in warm climates the soil be meliorated by the sun, it is no less meliorated by frost in cold climates. Frost acts upon water, by expanding it into a larger space. Frost has no effect upon dry earth; witness sand, upon which it it makes no impression. But upon wet earth it acts most vigorously: it expands the moisture, which requiring more space puts every particle of the earth out of its place, and separates them from each other. In that view, frost may be considered as a plough superior to any that is made, or can be made, by the hand of man: its action reaches the minutest particles; and, by dividing and separating them, it renders the soil loose and friable. This operation is the most remarkable in tilled land, which gives free access to frost. With respect to clay-soil in particular, there is no rule in husbandry more essential than to open it before winter in hopes of frost. It is even advisable in a clay-soil to leave the stubble rank, which, when ploughed in before winter, keeps the clay loose, and admits the frost into every cranny.

To apply this doctrine, it is dangerous to plough clay-foil when wet; because water is a cement for clay, and binds it so as to render it unfit for vegetation. It is, however, less dangerous to plough wet clay before winter, than after. A succeeding frost corrects the bad effects of such ploughing; a succeeding drought increases them.

117
Culture of
oats.

The common method is, to sow oats on new-ploughed land in the month of March, as soon as the ground is tolerably dry. If it continue wet all the month of March, it is too late to venture them after. It is much better to summer-fallow, and to sow wheat in the autumn. But the preferable method, especially in clay-soil, is to turn over the field after harvest, and to lay it open to the influences of frost and air, which lessen the tenacity of clay, and reduce it to a free mould. The surface-soil by this means is finely mellowed for reception of the seed; and it would be a pity to bury it by a second ploughing before sowing. In general, the bulk of clay-soils are rich; and skilful ploughing without dung, will probably give a better crop, than unskilful ploughing with dung.

Hitherto of natural clays. We must add a word of earse-clays which are artificial, whether left by the sea, or swept down from higher grounds by rain. The method commonly used of dressing earse-clay for oats, is, not to stir it till the ground be dry in the spring, which seldom happens before the first of March, and the seed is sown as soon after as the ground is sufficiently dry for its reception. Frost has a stronger effect on such clays than on natural clay. And if the field be laid open before winter, it is rendered so loose by frost as to be soon drenched in water. The particles at the same time are so small, as that the first drought in spring makes the surface cake or crust. The difficulty of reducing this crust into mould for covering the oat-

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seed, has led farmers to delay ploughing till the month of March. But we are taught by experience, that this soil ploughed before winter, is sooner dry than when the ploughing is delayed till spring; and as early sowing is a great advantage, the objection of the superficial crusting is easily removed by the first harrow above described, which will produce abundance of mould for covering the seed. The ploughing before winter not only procures early sowing, but has another advantage: the surface-soil that had been mellowed during winter by the sun, frost, and wind, is kept above.

The dressing a loamy soil for oats differs little from dressing a clay soil, except in the following particular, that being less hurt by rain, it requires not high ridges, and therefore ought to be ploughed crown and furrow alternately.

Where there is both clay and loam in a farm, it is obvious from what is said above, that the ploughing of the clay after harvest ought first to be dispatched. If both cannot be overtaken that season, the loam may be delayed till the spring with less hurt.

Next of a gravelly soil; which is the reverse of clay, as it never suffers but from want of moisture. Such a soil ought to have no ridges; but be ploughed circularly from the centre to the circumference, or from the circumference to the centre. It ought to be tilled after harvest: and the first dry weather in spring ought to be laid hold of to sow, harrow, and roll; which will preserve it in sap.

The culture of oats is the simplest of all. That grain is probably a native of Britain: it will grow on the worst soil with very little preparation. For that reason, before turnip was introduced, it was always the first crop upon land broken up from the state of nature.

Upon such land, may it not be a good method, to build upon the crown of every ridge, in the form of a wall, all the surface-earth, one foot above another, as in a fold for sheep? After standing in this form all the summer and winter, let the walls be thrown down, and the ground prepared for oats. This will secure one or two good crops; after which the land may be dunged for a crop of barley and grass-seeds. This method may answer in a farm where manure is scanty.

3. BARLEY.

THIS is a culmiferous plant that requires a mellow soil. Upon that account, extraordinary care is requisite where it is to be sown in clay. The land ought to be stirred immediately after the foregoing crop is removed, which lays it open to be mellowed with the frost and air. In that view, a peculiar sort of ploughing has been introduced, termed *ribbing*; by which the greatest quantity of surface possible is exposed to the air and frost. The obvious objection to this method is, that half of the ridge is left unmoved. And to obviate that objection, the following method is offered, which moves the whole soil, and at the same time exposes the same quantity of surface to the frost and air. As soon as the former crop is off the field, let the ridges be gathered with as deep a furrow as the soil will admit, beginning at the crown and ending at the furrows. This ploughing loosens the whole soil, giving free access to the air and frost. Soon after, begin a second ploughing in the following manner. Let the

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Culture of
barley.

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Ribbing.

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A better
method.

U

field

field be divided by parallel lines cros the ridges, with intervals of 30 feet or so. Plough once round an interval, beginning at the edges, and turning the earth toward the middle of the interval; which covers a foot or so of the ground formerly ploughed. Within that foot plough another round similar to the former; and after that, other rounds, till the whole interval be finished, ending at the middle. Instead of beginning at the edges, and ploughing toward the middle, it will have the same effect to begin at the middle and to plough toward the edges. Plough the other intervals in the same manner. As by this operation the furrows of the ridges will be pretty much filled up, let them be cleared and water-furrowed without delay. By this method, the field will be left waving like a plot in a kitchen-garden, ridged up for winter. In this form, the field is kept perfectly dry; for beside the capital furrows that separate the ridges, every ridge has a number of cros furrows that carry the rain instantly to the capital furrows. In hanging grounds retentive of moisture, the parallel lines above mentioned ought not to be perpendicular to the furrows of the ridges, but to be directed a little downward, in order to carry rain-water the more hastily to these furrows. If the ground be clean, it may lie in that state winter and spring, till the time of seed-furrowing. If weeds happen to rise, they must be destroyed by ploughing, or braking, or both; for there cannot be worse husbandry, than to put seed into dirty ground.

721
Advantages
of Time of
this method.

This method resembles common ribbing in appearance, but is very different in reality. As the common ribbing is not preceded by a gathering furrow, the half of the field is left untilled, compact as when the former crop was removed, impervious in a great measure to air or frost. The common ribbing at the same time lodges the rain-water on every ridge, preventing it from descending to the furrows; which is hurtful in all soils, and poisonous in a clay soil. The *stitching* here described, or *ribbing* if you please to call it so, prevents these noxious effects. By the two ploughings the whole soil is opened, admitting freely air and frost; and the multitude of furrows lays the surface perfectly dry, giving an early opportunity for the barley-seed.—But further, as to the advantage of this method: When it is proper to sow the seed, all is laid flat with the brake, which is an easy operation upon soil that is dry and pulverized; and the seed-furrow which succeeds, is so shallow as to bury little or none of the surface-earth: whereas the stirring for barley is commonly done with the deepest furrow; and consequently buries all the surface-soil that was mellowed by the frost and air. Nor is this method more expensive; because the common ribbing must always be followed with a stirring furrow, which is saved in the method recommended. Nay, it is less expensive; for after common ribbing, which keeps in the rain-water, the ground is commonly so fouled, as to make the stirring a laborious work.

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Time of
sowing.

Where the land is in good order, and free of weeds, April is the month for sowing barley. Every day is proper, from the first to the last.

The dressing loamy soil and light soil for barley, is the same with that described; only that to plough dry is not altogether so essential as in dressing clay-foil. Loam or sand may be stirred a little moist: better,

however, delay a week or two, than to stir a loam when moist. Clay must never be ploughed moist, even tho' the season should escape altogether. But this will seldom be necessary; for not in one year of 20 will it happen, but that clay is dry enough for ploughing some time in May. Frost may correct clay ploughed wet after harvest; but ploughed wet in the spring, it unites into a hard mass, not to be disolved but by very hard labour.

The foregoing culmiferous plants are what are ordinarily propagated for food in this country. What follow are leguminous plants.

4. BEANS.

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Culture of
beans.

THE properest soil for beans is a deep and moist clay. There was lately introduced into Scotland a method of sowing beans will a drill-plough, and horse-hoeing the intervals; which, beside affording a good crop, is a dressing to the ground. But as that method is far from being general, we keep in the common track.

As this grain is early sown, the ground intended for it should be ploughed before winter, to give access to the frost and air; beneficial in all soils, and necessary in a clay-soil. Take the first opportunity after January when the ground is dry, to loosen the soil with the harrow first described, till a mould be brought upon it. Sow the seed, and cover it with the second harrow. The third will smooth the surface, and cover the seed equally. These harrows make the very best figure in sowing beans; which ought to be laid deep in the ground, not less than six inches. In clay soil, the common harrows are altogether insufficient. The soil, which has rested long after ploughing, is rendered compact and solid: the common harrows skim the surface: the seed is not covered; and the first hearty shower of rain lays it above ground. Where the farmer overtakes not the ploughing after harvest, and is reduced to plough immediately before sowing, the plough answers the purpose of the first harrow; and the other two will complete the work. But the labour of the first harrow is ill saved; as the ploughing before winter is a fine preparation, not only for beans, but for grain of every kind. If the ground ploughed before winter happen by superfluity of moisture to cake, the first harrow going along the ridges, and crossing them, will loosen the surface, and give access to the air for drying. As soon as the ground is dry, stop without delaying a moment. If rain happen in the interim, there is no remedy but patience till a dry day or two come.

Carfe-clay, ploughed before winter, seldom fails to cake. Upon that account, a second ploughing is necessary before sowing; which ought to be performed with an ebb furrow, in order to keep the frost-mould as near the surface as possible. To cover the seed with the plough is expressed by the phrase *to sow under furrow*. The clouds raised in this ploughing, are a sort of shelter to the young plants in the chilly spring-months.

The foregoing method will answer for loam. And as for a sandy or gravelly soil, it is altogether improper for beans.

Though we cannot approve the horse-hoeing of beans, with the intervals that are commonly allotted for turnip, yet we would strongly recommend the drilling.

PRACTICE

PRACTICE

ling them at the distance of 10 or 12 inches, and keeping the intervals clear of weeds. This may be done by hand-hoeing, taking opportunity at the same time to lay fresh soil to the roots of the plants. But as this is an expensive operation, and hands are not always to be got, a narrow plough, drawn by a single horse, might be used, with a mould-board on each side to scatter the earth upon the roots of the plants. This is a cheap and expeditious method: it keeps the ground clean; and nourishes the plants with fresh soil.

As beans delight in a moist soil, and have no end of growing in a moist season, they cover the ground totally when sown broadcast, keep in the dew, and exclude the sun and air: the plants grow to a great height; but carry little seed, and that little not well ripened. This displays the advantage of drilling; which gives free access to the sun and air, dries the ground, and affords plenty of ripe seed.

5. PEASE.

PEASE are of two kinds; the white, and the gray. The cultivation of the latter only belongs to this place.

There are two species of the gray kind, distinguished by their time of ripening. One ripens soon, and for that reason is termed *hot feed*: the other, which is slower in ripening, is termed *cold feed*.

Pease, a leguminous crop, is proper to intervene between two culmiferous crops, less for the profit of a pease-crop, than for meliorating the ground. Pease however, in a dry season, will produce six or seven bolls each acre; but, in an ordinary season, they seldom reach above two, or two and a half. Hence, in a moist climate, which all the west of Britain is, red clover seems a more beneficial crop than pease; as it makes as good winter-food as pease, and can be cut green thrice during summer.

A field, intended for cold feed, ought to be ploughed in October or November; and in February, as soon as the ground is dry, the seed ought to be sown on the winter-furrow. A field intended for hot feed, ought to be ploughed in March or April, immediately before sowing. But if infested with weeds, it ought to be also ploughed in October or November.

Pease laid a foot below the surface will vegetate; but the most approved depth is six inches in light soil, and four inches in clay soil; for which reason, they ought to be sown under furrow when the ploughing is delayed till spring. Of all grain, beans excepted, they are the least in danger of being buried.

Pease differ from beans, in loving a dry soil and a dry season. Horse-hoeing would be a great benefit, could it be performed to any advantage; but pease grow expeditiously, and soon fall over and cover the ground, which bars ploughing. Horse-hoeing has little effect when the plants are new sprung; and when they are advanced to be benefited by that culture, their length prevents it. Fast growing at the same time is the cause of their carrying so little seed: the seed is buried among the leaves; and the sun cannot penetrate to make it grow and ripen. The only practicable remedy to obtain grain, is thin sowing; but thick sowing produces more straw, and mellows the ground more. Half a boll for an English acre may be reckoned thin sowing; three firlots, thick sowing.

Notwithstanding what is said above, Mr Hunter, a

noted farmer in Berwickshire, began some time ago to sow all his pease in drills; and never failed to have great crops of corn as well as of straw. He sowed double rows at a foot interval, and two feet and an half between the double rows, which admit horse-hoeing. By that method, he had also good crops of beans on light land.

Pease and beans mixed are often sown together, in order to catch different seasons. In a moist season, the beans make a good crop; in a dry season, the pease.

The growth of plants is commonly checked by drought in the month of July; but promoted by rain in August. In July, grass is parched; in August, it recovers verdure. Where pease are so far advanced in the dry season as that the seed begins to form, their growth is indeed checked, but the seed continues to fill. If only in the blossom at that season, their growth is checked a little; but they become vigorous again in August, and continue growing without filling till stopped by frost. Hence it is, that cold feed, which is early sown, has the best chance to produce corn: hot feed, which is late sown, has the best chance to produce straw.

The following method is practised in Norfolk, for sowing pease upon a dry light soil, immediately opened from pasture. The ground is pared with a plough extremely thin, and every sod is laid exactly on its back. In every sod a double row of holes is made. A pea dropt in every hole lodges in the flay'd ground immediately below the sod, thrusts its roots horizontally, and has sufficient moisture. This method enabled Norfolk farmers, in the barren year 1740, to furnish white pease at 12 s. per boll.

II. Plants cultivated for Roots.

1. TURNIP.

TURNIP delights in a gravelly soil; and there it can be raised to the greatest perfection, and with the least hazard of miscarriage. At the same time, there is no soil but will bear turnip when well prepared.

No person ever deserved better of a country, than he who first cultivated turnip in the field. No plant is better fitted for the climate of Britain, no plant prospers better in the coldest part of it, and no plant contributes more to fertility. In a word, there has not for two centuries been introduced into Britain a more valuable improvement.

Of all roots, turnip requires the finest mould; and to that end, of all harrows frost is the best. In order to give access to frost, the land ought to be prepared by ribbing after harvest, as above directed in preparing land for barley. If the field be not subject to annuals, it may lie in that state till the end of May; or otherwise the weeds must be destroyed by a braking about the middle of April; and again in May, if weeds rise. The first week of June, plough the field with a shallow furrow. Lime it if requisite, and harrow the lime into the soil. Draw single furrows with intervals of three feet, and lay dung in the furrows. Cover the dung sufficiently, by going round it with the plough, and forming the three-feet spaces into ridges. The dung comes thus to lie below the crown of every ridge.

The season of sowing must be regulated by the time season and intended for feeding. Where intended for feeding in November, sowing.

U 2

November,

124
Culture of
pease.125
Culture of
turnip.

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November, December, January, and February, the seed ought to be sown from the 1st to the 20th of June. Where the feeding is intended to be carried on to March, April, and May, the seed must not be sown till the end of July. Turnip sown earlier than above directed, flowers that very summer, and runs fast to seed; which renders it in a good measure unfit for food. If sown much later, it does not apple, and there is no food but from the leaves.

Though by a drill-plough the feed may be sown of any thickness, the safest way is to sow thick. Thin sowing is liable to many accidents, which are far from being counterbalanced by the expence that is saved in thinning. Thick-sowing can bear the ravage of the black fly, and leave a sufficient crop behind. It is a protection against drought, gives the plants a rapid progress, and establishes them in the ground before it is necessary to thin them.

The sowing turnip broadcast is universal in England, and common in Scotland, though a barbarous practice. The eminent advantage of turnip is, that beside a profligate crop, it makes a most complete fallow; and the latter cannot be obtained but by horse-hoeing. Upon that account, the sowing turnip in rows at three feet distance is recommended. Wider rows answer no profitable end, flatter rows afford not room for a horse to walk in. When the turnip is about four inches high, annual weeds will appear. Go round every interval with the slightest furrow possible, at the distance of two inches from each row, moving the earth from the rows toward the middle of the interval. A thin plate of iron must be fixed on the left side of the plough, to prevent the earth from falling back, and burying the turnip. Next, let women be employed to weed the rows with their fingers; which is better, and cheaper done, than with the hand-hoe. The hand-hoe, beside, is apt to disturb the roots of the turnip that are to stand, and to leave them open to drought by removing the earth from them. The standing turnip are to be at the distance of twelve inches from each other: a greater distance makes them swell too much; a less distance affords them not sufficient room. A woman soon comes to be expert in finger-weeding. The following hint may be necessary to a learner. To secure the turnip that is to stand, let her cover it with the left hand; and with the right pull up the turnip on both sides. After thus freeing the standing turnip, she may safely use both hands. Let the field remain in this state, till the appearance of new annuals make a second ploughing necessary; which must be in the same furrow with the former, but a little deeper. As in this ploughing the iron plate is to be removed, part of the loose earth will fall back on the roots of the plants: the rest will fill the middle of the interval, and bury every weed. When weeds begin again to appear, then is the time for a third ploughing in an opposite direction, which lays the earth to the roots of the plants. This ploughing may be about the middle of August; after which, weeds rise very faintly. If they do rise, another ploughing will clear the ground of them.

Weeds that at this time rise in the row, may be cleared with a hand-hoe, which can do little mischief among plants distant twelve inches from each other. It is certain however, that it may be done cheaper with the hand (c). And after the leaves of turnips in a row meet together, the hand is the only instrument that can be applied for weeding.

In swampy ground, the surface of which is best reduced by paring and burning, the feed may be sown in rows with intervals of a foot. To save time, a drill-plough may be used that sows three or four rows at once. Hand-hoeing is proper for such ground; because the soil under the burnt *stratum* is commonly full of roots, which digelt and rot better under ground than when brought to the surface by the plough. In the mean time, while these are digesting, the ashes will secure a good crop.

2. POTATOES.

The choice of soil is not of greater importance in any other plant than in a potato. This plant in clay potatoes, or in rank black loam lying low without ventilation, never makes palatable food. In a gravelly or sandy soil, exposed to the sun and to free air, it thrives to perfection, and has a good relish. But a rank black loam, though improper to raise potatoes for the table, produces them in great plenty; and the product is, as already observed, a palatable food for horned cattle, hogs, and poultry.

The spade is a proper instrument for raising a small quantity, or for preparing corners or other places inaccessible to the plough; but for raising potatoes in quantities, the plough is the only instrument.

As two great advantages of a drilled crop, are, to destroy weeds, and to have a fallow at the same time with the crop, no judicious farmer will think of raising potatoes in any other way. In September or October, as soon as that year's crop is removed, let the field have a rousing furrow, a cross-braking next, and then be cleared of weeds by the cleaning harrow. Form it into three-foot ridges, in that state to lie till April, which is the proper time for planting potatoes. Cross-bake it, to raise the furrows a little. Then lay well-digested horse-dung along the furrows, upon which lay the roots at eight inches distance. Cover up these roots with the plough, going once round every row. This makes a warm bed for the potatoes; hot dung below, and a loose covering above, that admits every ray of the sun. As soon as the plants appear above ground, go round every row a second time with the plough, which will lay upon the plants an additional inch or two of mould, and at the same time bury all the annuals; and this will complete the ploughing of the ridges. When the potatoes are six inches high, the plough, with the deepest furrow, must go twice along the middle of each interval in opposite directions, laying earth first to one row, and next to the other. And to perform this work, a plough with a double mould-board will be more expeditious. But as the earth cannot be laid close to the roots by the plough, the spade must succeed, with which

(c) Children under thirteen may be employed to weed turnip with the fingers. We have seen them go on in that work with alacrity; and a small premium will have a good effect. For boys and girls above thirteen, a hand-hoe adapted to their size is an excellent instrument: it strengthens the arms amazingly. In driving the plough, the legs only are exercised; but as the arms are chiefly employed in husbandry, they ought to be prepared beforehand by gentle exercise.

PRACTICE which four inches of the plants must be covered, leaving little more but the tops above ground; and this operation will at the same time bury all the weeds that have sprung since the former ploughing. What weeds arise after, must be pulled up with the hand. A hoe is never to be used here: it cannot go so deep as to destroy the weeds without cutting the fibres of the plants; and if it skim the surface, it only cuts off the heads of the weeds, and does not prevent their pulling again.

¹¹⁸
Best method
of taking
them up.

The shortest and most perfect method of taking up potatoes, is to plough once round every row at the distance of four inches, removing the earth from the plants, and gathering up with the hand all the potatoes that appear. The distance is made four inches, to prevent cutting the roots, which are seldom found above that distance from the row on each side. When the ground is thus cleared by the plough, raise the potatoes with a fork having three broad toes or claws; which is better than a spade, as it does not cut the potatoes. The potatoes thus laid above ground, must be gathered with the hand. By this method scarce a potatoe will be left.

¹²⁹
Of prefer-
ring them.

As potatoes are a comfortable food for the low people, it is of importance to have them all the year round. For a long time, potatoes in Scotland were confined to the kitchen-garden; and after they were planted in the field, it was not imagined at first that they could be used after the month of December. Of late years, they have been found to answer even till April; which has proved a great support to many a poor family, as they are easily cooked, and require neither kiln nor mill. But there is no cause for stopping there. It is easy to preserve them till the next crop: When taken out of the ground, lay in the corner of a barn a quantity that may serve till April, covered from frost with dry straw pressed down: bury the remainder in a hole dug in dry ground, mixed with the hulks of dried oats, sand, or the dry leaves of trees, over which build a stack of hay or corn. When the pit is opened for taking out the potatoes, the eyes of what have a tendency to push, must be cut out; and this cargo will serve all the month of June. To be still more certain of making the old crop meet the new, the setting of a small quantity may be delayed till June, to be taken up at the ordinary time before frost. This cargo, having not arrived to full growth, will not be so ready to push as what are set in April.

If the old crop happen to be exhausted before the new crop is ready, the interval may be supplied by the potatoes of the new crop that lie next the surface, to be picked up with the hand; which, far from hurting the crop, will rather improve it.

3. CARROT and PARSNIP.

¹³⁰
Culture of
carrot.

Of all roots, a carrot requires the deepest soil. It ought at least to be a foot deep, all equally good from top to bottom. If such a soil be not in the farm, it may be made artificially by trench-ploughing, which brings to the surface what never had any communication with the sun or air. When this new soil is sufficiently improved by a crop or two with dung, it is fit for bearing carrots. Beware of dunging the year when the carrots are sown; for with fresh dung they seldom escape rotten scabs.

The only soils proper for that root, are a loam and a **PRACTICE** sandy soil.

The ground must be prepared by the deepest furrow that can be taken, the sooner after harvest the better; immediately upon the back of which, a ribbing ought to succeed, as directed for barley. At the end of March, or beginning of April, which is the time of sowing the seed, the ground must be smoothed with a rake. Sow the seed in drills, with intervals of a foot for hand-hoeing: which is no expensive operation where the crop is confined to an acre or two: but if the quantity of ground be greater, the intervals ought to be three feet, in order for horse-hoeing.

In flat ground without ridges, it may be proper to make parallel furrows with the plough, ten feet from each other, in order to carry off any redundant moisture.

At Parlington in Yorkshire, from the end of September to the first of May, 20 work-horses, four bullocks, and six milk-cows, were fed on the carrots that grew on three acres; and these animals never tasted any other food but a little hay. The milk was excellent: and, over and above, 30 hogs were fattened upon what was left by the other beasts. We have this fact from undoubted authority.

The culture of parsnips is the same with that of ¹³¹Parinips, carrots.

III. Plants Cultivated for Leaves.

THERE are many garden-plants of this kind. The plants proper for the field are cabbage-red and white, colewort plain and curled. As there is very little difference in the cultivation of these plants, we shall confine ourselves to cabbage. The reader will easily apply to the other plants the directions to be given concerning cabbage.

Cabbage is an interesting article in husbandry. It is easily raised, is subject to few diseases, resists frost more than turnip, is palatable to cattle, and sooner fills them than turnip, carrot, or potatoes. ¹³² Culture of cabbage.

The season for setting cabbage, depends on the use it is intended for. If intended for feeding in November, December, and January, plants procured from seed sown the end of July the preceding year, must be set in March or April. If intended for feeding in March, April, and May, the plants must be set the first week of the preceding July, from seed sown in the end of February or beginning of March the same year. The late setting of the plants retards their growth; by which means they have a vigorous growth the following spring. And this crop makes an important link in the chain that connects winter and summer green food. Where cabbage for spring-food happens to be neglected, a few acres of rye, sown at Michaelmas, will supply the want. After the rye is consumed, there is time sufficient to prepare the ground for turnip.

And now to prepare a field for cabbage. Where the plants are to be set in March, the field must be made up after harvest, in ridges three feet wide. In that form let it lie all winter, to be mellowed with air and frost. In March, take the first opportunity, between wet and dry, to lay dung in the furrows. Cover the dung with a plough, which will convert the furrow into a crown, and consequently the crown into a furrow. Set the plants upon the dung, distant from each other

PRACTICE

other three feet. Plant them so as to make a straight line cros the ridges, as well as along the furrows, to which a gardener's line stretched perpendicularly cros the furrows will be requisite. This will set each plant at the distance precisely of three feet from the plants that surround it. The purpose of this accuracy, is to give opportunity for ploughing, not only along the ridges, but cros them. This mode is attended with three signal advantages: it saves hand-hoeing, it is a more complete dressing to the soil, and it lays earth neatly round every plant.

If the soil be deep and composed of good earth, a trench-ploughing after the preceding crop will not be amiss; in which case, the time for dividing the field into three-foot ridges as above, ought to be immediately before the dunging for the plants.

If weeds happen to rise so close to the plants as not to be reached by the plough, it will require very little labour to destroy them with a hand-hoe.

Unless the soil be much infested with annuals, twice ploughing after the plants are set will be a sufficient dressing. The first removes the earth from the plants; the next, at the distance of a month or so, lays it back.

Where the plants are to be set in July, the field must be ribbed as directed for barley. It ought to have a slight ploughing in June before the planting, in order to loosen the soil, but not so as to bury the surface-earth; after which the three-foot ridges must be formed, and the other particulars carried on as directed above with respect to plants that are to be set in March.

SECT. IV. Culture of Grass.

THE grasses commonly sown for pasture, for hay, or to cut green for cattle, are red clover, white clover, yellow clover, ryegrass, narrow-leaved plantain commonly called *ribwort*, saintfoin, and lucerne.

Red clover is of all the most proper to be cut green for summer-food. It is a biennial plant when suffered to perfect its seed; but when cut green, it will last three years, and in a dry soil longer. At the same time the safest course is to let it stand but a single year: if the second year's crop happen to be scanty, it proves, like a bad crop of pease, a great encourager of weeds by the shelter it affords them.

Here, as in all other crops, the goodness of seed is of importance. Chuse plump seed of a purple colour, because it takes on that colour when ripe. It is red when hurt in the drying, and of a faint colour when unripe.

²³³
Of red clo-
ver.

Red clover is luxuriant upon a rich soil, whether clay, loam, or gravel: it will grow even upon a moor, when properly cultivated. A wet soil is its only bane; for there it does not thrive.

To have red clover in perfection, weeds must be extirpated, and stones taken off. The mould ought to be made as fine as harrowing can make it; and the surface be smoothed with a light roller, if not sufficiently smooth without it. This gives opportunity for distributing the seed evenly: which must be covered by a small harrow with teeth no larger than of a garden-rake, three inches long, and six inches asunder*. In harrowing, the man should walk behind with a rope in his hand fixed to the back part of the harrow, ready to disentangle it from stones, clods, turnip or cab-

* Plate V.
fig. 7.

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bage roots, which would trail the seed, and displace it.

Nature has not determined any precise depth for the seed of red clover more than of other feed. It will grow vigorously from two inches deep, and it will grow when barely covered. Half an inch may be reckoned the most advantageous position in clay soil, a whole inch in what is light or loose. It is a vulgar error, that small seed ought to be sparingly covered. Miled by that error, farmers commonly cover their clover-feed with a bushy branch of thorn; which not only covers it unequally, but leaves part on the surface to wither in the air.

The proper season for sowing red-clover, is from the middle of April to the middle of May. It will spring from the first of March to the end of August; but such liberty ought not to be taken except from necessity.

There cannot be a greater blunder in husbandry, than to be sparing of feed. Ideal writers talk of sowing an acre with four pounds. That quantity of seed, say they, will fill an acre with plants as thick as they ought to stand. This rule may be admitted where grain is the object; but it will not answer with respect to grass. Grass-feed cannot be sown too thick: the plants shelter one another: they retain all the dew; and they must push upward, having no room laterally. Observe the place where a sack of pease, or of other grain, has been set down for sowing: the seed drop there accidentally grows more quickly than in the rest of the field, soon thin out of hand. A young plant of clover, or of saintfoin, according to Tull, may be raised to a great size where it has room; but the field will not produce half the quantity. When red clover is sown for cutting green, there ought not to be less than 24 pounds to an acre. A field of clover is seldom too thick: the smaller a stem be, the more acceptable it is to cattle. It is often too thin; and when so, the stems tend to wood.

Red clover is commonly sown with grain; and the most proper grain has been found by experience to be flax. The soil must be highly cultivated for flax as well as for red clover. The proper season of sowing is the same for both: the leaves of flax being very small, admit of free circulation of air; and flax being an early crop, is removed so early as to give the clover time for growing. In a rich soil it has grown so fast, as to afford a good cutting that very year. Next to flax, barley is the best companion to clover. The soil must be loose and free for barley; and so it ought to be for clover: the season of sowing is the same; and the clover is well established in the ground, before it is over-topped by the barley. At the same time, barley commonly is sooner cut than either oats or wheat. In a word, barley is rather a nurse than a stepmother to clover during its infancy. When clover is sown in spring upon wheat, the soil, which has lain five or six months without being stirred, is an improper bed for it; and the wheat, being in the vigour of growth, overtops it from the beginning. It cannot be sown along with oats, because of the hazard of frost; and when sown as usual among the oats three inches high, it is over-topped, and never enjoys free air till the oats be cut. Add, that where oats are sown upon the winter-furrow, the soil is rendered as hard as when under wheat.—Red clover is sometimes sown by itself, with-
out

²³⁴
Of sowing
clover with
grain.

Fig. 1. Chain Plough



Fig. 2. Brake

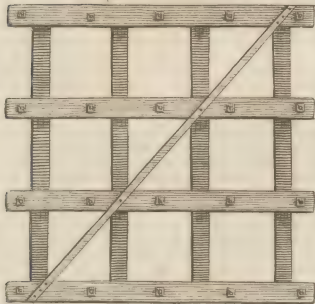


Fig. 3. first Harrow

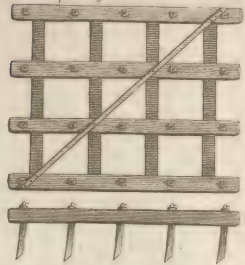


Fig. 4. second Harrow

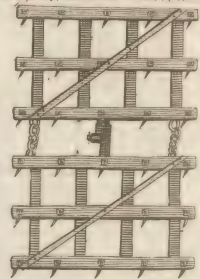
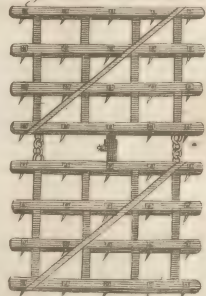


Fig. 5. third Harrow



A Ball Sulp.

Fig. 6. Cleaning Harrow

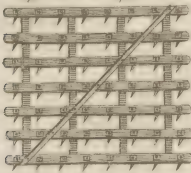
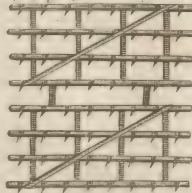


Fig. 7. Grub - bed Harrow





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out other grain : but this method, beside losing a crop, is not salutary ; because clover in its infant state requires shelter.

As to the quantity of grain proper to be sown with clover : In a rich soil well pulverized, a peck of barley on an English acre is all that ought to be ventured ; but there is not much soil in Scotland so rich. Two Linlithgow firlots make the proper quantity for an acre that produces commonly six bolls of barley ; half a firlot for what produces nine bolls. To those who are governed by custom, so small a quantity will be thought ridiculous. Let them only consider, that a rich soil in perfect good order, will from a single seed of barley produce 20 or 30 vigorous stems. People may flatter themselves with the remedy of cutting barley green for food, if it happen to oppress the clover. This is an excellent remedy in a field of an acre or two ; but the cutting an extensive field for food must be slow ; and while one part is cutting, the clover is smothered in other parts.

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White and yellow clover, ribwort, & ryegrass.

The culture of white clover, of yellow clover, of ribwort, of ryegrass, is the same in general with that of red clover. We proceed to their peculiarities. Yellow clover, ribwort, ryegrass, are all of them early plants, blooming in the end of April or beginning of May. The two latter are evergreens, and therefore excellent for winter-pasture. Ryegrass is less hurt by frost than any of the clovers, and will thrive in a moister soil : nor in that soil is it much affected by drought. In a rich soil, it grows four feet high : even in the dry summer 1775, it rose to three feet eight inches ; but it had gained that height before the drought came on. These grasses are generally sown with red clover for producing a plentiful crop. The proportion of seed is arbitrary ; and there is little danger of too much. When ryegrass is sown for procuring seed, five firlots wheat-measure may be sown on an acre ; and for procuring seed of ribwort, 40 pounds may be sown. The roots of ryegrass spread horizontally : they bind the soil by their number ; and tho' small, are yet so vigorous as to thrive in hard soil. Red clover has a large tap-root, which cannot penetrate any soil but what is open and free ; and the largeness of the root makes the soil still more open and free. Ryegrass, once a great favourite, appears to be discarded in most parts of Britain. The common practice has been, to sow it with red clover, and to cut them promiscuously the beginning of June for green food, and a little later for hay. This indeed is the proper season for cutting red clover, because at that time it begins to flower ; but as at that time the seed of the ryegrass is approaching to maturity, its growth is stopped for that year, as much as of oats or barley cut after the seed is ripe. Oats or barley cut green before the seed forms, will afford two other cuttings ; which is the case of ryegrass, of yellow clover, and of ribwort. By such management, all the profit will be drawn that these plants can afford.

When red clover is intended for seed, the ground ought to be cleared of weeds, were it for no other purpose than that the seed cannot otherwise be preserved pure : what weeds escape the plough, ought to be taken out by the hand. In England, when a crop of seed is intended, the clover is always first cut for hay. This appears to be done, as in fruit-trees, to check the growth of the wood, in order to encourage the fruit.

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This practice will not answer in Scotland, as the feed would often be too late for ripening. It would do better to eat the clover with sheep till the middle of May, which would allow the feed to ripen. The feed is ripe when, upon rubbing it between the hands, it parts readily from the hulk. Then apply the scythe, spread the crop thin, and turn it carefully. When perfectly dry, take the first opportunity of a hot day for threshing it on boards covered with a coarse sheet. Another way less subject to risk, is to stack the dry hay, and to thresh it the end of April. After the first threshing, expose the husks to the sun, and thresh them over and over till no feed remain. Nothing is more efficacious than a hot sun to make the hulk part with its feed ; in which view it may be exposed to the sun by parcels, an hour or two before the flail is applied.

White clover, intended for seed, is managed in the same manner. No plant ought to be mixed with ryegrass that is intended for seed. In Scotland, much ryegrass feed is hurt by transgressing that rule. The feed is ripe when it parts easily from the hulk. The yellowness of the stem is another indication of its ripeness ; in which particular it resembles oats, barley, and other culmiferous plants. The best manner to manage a crop of ryegrass for seed, is to bind it loosely in small sheaves, widening them at the bottom to make them stand erect ; as is done with oats in moist weather. In that state they may stand till sufficiently dry for threshing. By this method they dry more quickly, and are less hurt by rain, than by close binding and putting the sheaves in shocks like corn. The worst way of all is to spread the ryegrass on the moist ground, for it makes the feed malten. The sheaves, when sufficiently dry, are carried into clove carts to where they are to be threshed on a board, as mentioned above for clover. Put the straw in a rick when a hundred stone or so are threshed. Carry the threshing-board to the place where another rick is intended ; and so on till the whole seed be threshed, and the straw ricked. There is necessity for clove carts to save the seed, which is apt to drop out in a hot sun ; and, as observed above, a hot sun ought always to be chosen for threshing. Carry the seed in sacks to the granary or barn, there to be separated from the husks by a fanter. Spread the seed thin upon a timber-floor, and turn it once or twice a day till perfectly dry. If suffered to take a heat, it is useless for seed.

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Culture of sainfoin.

The writers on agriculture reckon saintfoin preferable to clover in many respects : They say, that it produces a larger crop ; that it does not hurt cattle when eaten green ; that it makes better hay ; that it continues four times longer in the ground ; and that it will grow on land that will bear no other crop. These are great advantages : But, as we have so little of that kind of grass in Scotland, it cannot be expected that any directions can be given concerning the manner of cultivating it, founded upon experience. We must therefore confine ourselves to such facts as are mentioned by authors of the best credit.

Sainfoin has a very long tap-root, which is able to pierce very hard earth. The roots grow very large ; and the larger they are, they penetrate to the greater depth ; and hence it may be concluded, that this grass, when it thrives well, receives a great part of its nourishment from below the *surface* of the soil : of course, a deep dry soil

PRACTICE soil is best for the culture of saintfoin. When plants draw their nourishment from that part of the soil that is near the surface, it is not of much consequence whether their number be great or small. But the case is very different when the plants receive their food, not only near, but also deep below, the surface. Besides, plants that shoot their roots deep are often supplied with moisture, when those near the surface are parched with drought.

To render the plants of saintfoin vigorous, it is necessary that they be sown thin. The best method of doing this is by a drill; because, when sown in this manner, not only the weeds, but also the supernumerary plants, can easily be removed. It is several years before saintfoin comes to its full strength; and the number of plants sufficient to stock a field, while in this imperfect state, will make but a poor crop for the first year or two. It is therefore necessary that it be sown in such a manner as to make it easy to take up plants in such numbers, and in such order, as always to leave in the field the proper number in their proper places. This can only be done, with propriety, by sowing the plants in rows by a drill. Supposing a field to be drilled in rows at ten inches distance, the partitions may be hand-hoed, and the rows dressed in such a manner as to leave a proper number of plants. In this situation the field may remain two years; then one fourth of the rows may be taken out in pairs, in such a manner as to make the beds of fifty inches, with six rows in each, and intervals of thirty inches, which may be ploughed. Next year, another fourth of the rows may be taken out in the same manner, so as to leave double rows with partitions of ten inches, and intervals of thirty: All of which may be hoed at once or alternately, as it may be found most convenient.

The great quantity of this grass which the writers on this subject assure us may be raised upon an acre, and the excellency and great value of the hay made of it, should induce farmers to make a complete trial of it, and even to use the spade in place of the hoe, or hoe-plough, if necessary.

The plants taken up from a field of saintfoin may be set in another field; and if the transplanting of this grass succeeds as well as the transplanting of lucerne has done with Mr Lumin de Chateauxvieux, the trouble and expence will be sufficiently recompensed by the largeness of the crops. In transplanting, it is necessary to cut off great part of the long tap-root: this will prevent it from striking very deep into the soil, and make it push out large roots in a sloping direction from the cut end of the tap-root. Saintfoin managed in this manner, will thrive even on shallow land that has a wet bottom, provided it be not overstocked with plants.

Whoever inclines to try the culture of this grass in Scotland, should take great pains in preparing the land, and making it as free from weeds as possible.

The writers on agriculture, ancient as well as modern, bestow the highest encomiums upon lucerne as affording excellent hay, and producing very large crops. Lucerne remains at least 10 or 12 years in the ground, and produces about eight tons of hay upon the Scots acre. There is but little of it cultivated in Scotland. However, it has been tried in several parts of that country; and it is found, that, when the seed

is good, it comes up very well, and stands the winter-frost. But the chief thing which prevents this grass from being more used in Scotland, is the difficulty of keeping the soil open, and free from weeds. In a few years the surface becomes so hard, and the turf so strong, that it destroys the lucerne before the plants have arrived at their greatest perfection: so that lucerne can scarce be cultivated with success there, unless some method be fallen upon of destroying the natural grass, and prevent the surface from becoming hard and impenetrable. This cannot be done effectually by any other means than horse-hoeing. This method was first proposed by Mr Tull, and afterwards practised successfully by M. de Chateauxvieux near Geneva. It may be of use therefore to give a view of that gentleman's method of cultivating lucerne.

He does not mention any thing particular as to the manner of preparing the land; but only observes in general, that no pains should be spared in preparing it. He tried the sowing of lucerne both in rows upon the beds where it was intended to stand, and likewise the sowing it in a nursery, and afterwards transplanting it into the beds prepared for it. He prefers transplanting; because, when transplanted, part of the tap-root is cut off, and the plant shoots out a number of lateral branches from the cut part of the root, which makes it spread its roots nearer the surface, and consequently renders it more easily cultivated: besides, this circumstance adapts it to a shallow soil, in which, if left in its natural state, it would not grow.

The transplanting of lucerne is attended with many advantages. The land may be prepared in the summer for receiving the plants from the nursery in autumn; by which means the field must be in a much better situation than if the seed had been sown upon it in the spring. By transplanting, the rows can be made more regular, and the intended distances more exactly observed; and consequently the hoeing can be performed more perfectly, and with less expence. Mr Chateauxvieux likewise tried the lucerne in single beds three feet wide, with single rows; in beds three feet nine inches wide, with double rows; and in beds four feet three inches wide, with triple rows. The plants in the single rows were six inches asunder, and those in the double and triple rows were about eight or nine inches. In a course of three years he found, that a single row produced more than a triple row of the same length. The plants of lucerne, when cultivated by transplantation, should be at least six inches asunder, to allow them room for extending their crowns.

He further observes, that the beds or ridges ought to be raised in the middle; that a small trench, two or three inches deep, should be drawn in the middle; and that the plants ought to be set in this trench, covered with earth up to the neck. He says, that if the lucerne be sown in spring, and in a warm soil, it will be ready for transplanting in September; that, if the weather be too hot and dry, the transplanting should be delayed till October; and that, if the weather be unfavourable during both these months, this operation must be delayed till spring. He further directs, that the plants should be carefully taken out of the nursery, so as not to damage the roots; that the roots be left only about six or seven inches long; that the green crops be cut off within about two inches of the crown; that

PRACTICE that they be put into water as soon as taken up, there to remain till they are planted; and that they should be planted with a planting-stick, in the same manner as cabbages.

He does not give particular directions as to the times of horse-hoeing; but only says in general, that the intervals should be stirred once in the month during the whole time that the lucerne is in a growing state. He likewise observes, that great care ought to be taken not to suffer any weeds to grow among the plants, at least for the first two or three years; and for this purpose, that the rows, as well as the edges of the intervals where the plough cannot go, should be weeded by the hand.

SECT. V. *Rotation of Crops.*

¹²⁸
Rotation of crops. No branch of husbandry requires more skill and sagacity than a proper rotation of crops, so as to keep the ground always in heart, and yet to draw out of it the greatest profit possible. Some plants rob the soil, others are gentle to it: some bind, others loosen. The nice point is, to intermix crops, so as to make the greatest profit consistently with keeping the ground in trim. In that view, the nature of the plants employed in husbandry, must be accurately examined.

¹³⁰
Culmiferous and leguminous plants. The difference between culmiferous and leguminous plants, is occasionally mentioned above *. With respect to the present subject, a closer inspection is necessary. Culmiferous plants, having small leaves and few in number, depend mostly on the soil for nourishment, and little on the air. During the ripening of the seed, they draw probably their whole nourishment from the soil; as the leaves by this time, being dry and withered, must have lost their power of drawing nourishment from the air. Now, as culmiferous plants are chiefly cultivated for their feed, and are not cut down till the seed be fully ripe, they may be pronounced all of them to be robbers, some more, some less. But such plants, while young, are all leaves; and in that state draw most of their nourishment from the air. Hence it is, that where cut green for food to cattle, a culmiferous crop is far from being a robber. A hay-crop accordingly, even where it consists mostly of ryegrass, is not a robber, provided it be cut before the seed is formed; which at any rate it ought to be, if one would have hay in perfection. And the foggage, excluding the frost by covering the ground, keeps the roots warm. A leguminous plant, by its broad leaves, draws much of its nourishment from the air. A cabbage, which has very broad leaves, and a multitude of them, owes its growth more to the air than to the soil. One fact is certain, that a cabbage cut and hung up in a damp place, preserves its verdure longer than other plants. At the same time, a seed is that part of a plant which requires the most nourishment; and for that nourishment a culmiferous plant must be indebted entirely to the soil. A leguminous crop, on the contrary, when cut green for food, must be very gentle to the ground. Pease and beans are leguminous plants; but being cultivated for feed, they seem to occupy a middle station: their feed makes them more severe than other leguminous crops cut green; their leaves, which grow till reaping, make them less severe than a culmiferous plant left to ripen.

These plants are distinguished no less remarkably by
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PRACTICE the following circumstance. All the seeds of a culmiferous plant ripen at the same time. As soon as they begin to form, the plant becomes stationary, the leaves wither, the roots cease to pull, and the plant when cut down is blanched and sapless. The seeds of a leguminous plant are formed successively: flowers and fruit appear at the same time in different parts of the plant. This plant accordingly is continually growing, and pushing its roots. Hence the value of bean or pease straw above that of wheat or oats: the latter is withered and dry when the crop is cut; the former, green and succulent. The difference therefore, with respect to the soil, between a culmiferous and leguminous crop, is great. The latter, growing till cut down, keeps the ground in constant motion, and leaves it to the plough loose and mellow. The former gives over growing long before reaping; and the ground, by want of motion, turns compact and hard. Nor is this all. Dew falling on a culmiferous crop after the ground begins to harden, rests on the surface, and is sucked up by the next sun. Dew that falls on a leguminous crop, is shaded from the sun by the broad leaves, and sinks at leisure into the ground. The ground accordingly, after a culmiferous crop, is not only hard, but dry: after a leguminous crop, it is not only loose, but soft and unctuous.

Of all culmiferous plants, wheat is the most severe, by the long time it occupies the ground without admitting a plough. And as the grain is heavier than that of barley or oats, it probably requires more nourishment than either. It is observed above, that as pease and beans draw part of their nourishment from the air by their green leaves while allowed to stand, they draw the less from the ground; and by their constant growing they leave it in good condition for subsequent crops. In both respects they are preferable to any culmiferous crop.

Culmiferous crops, as observed above, are not robbers when cut green: the soil, far from hardening, is kept in constant motion by the pushing of the roots, and is left more tender than if it had been left at rest without any bearing crop.

Bulbous-rooted plants are above all successful in dividing and pulverising the soil. Potatoe-roots grow six, eight, or ten, inches under the surface; and, by their size and number, they divide and pulverise the soil better than can be done by the plough; consequently, whatever be the natural colour of the soil, it is black when a potatoe-crop is taken up. The potatoe, however, with respect to its quality of dividing the soil, must yield to a carrot or parsnip; which are large roots, and pierce often to the depth of 18 inches. The turnip, by its tap-root, divides the soil more than can be done by a fibrous-rooted plant; but as its bulbous root grows mostly above ground, it divides the soil less than the potatoe, the carrot, or the parsnip. Red clover, in that respect, may be put in the same class with potatoe.

Whether potatoes or turnip be the more gentle crop, appears a puzzling question. The former bears feed, and probably draws more nourishment from the soil than the latter, when cut green. On the other hand, potatoes divide the soil more than turnip, and leave it more loose and friable. It appears no less puzzling, to determine between cabbage and turnip: the former draws

PRACTICE draws more of its nourishment from the air, the latter leaves the soil more free and open.

The result of the whole is what follows : Culmiferous plants are robbers ; some more, some less : they at the same time bind the soil ; some more, some less. Leguminous plants in both respects are opposite : if any of them rob the soil, it is in a very slight degree ; and all of them without exception loosen the soil. A culmiferous crop, however, is generally the more profitable : but few soils can long bear the burden of such crops, unless relieved by interjected leguminous crops. These, on the other hand, without a mixture of culmiferous crops, would soon render the soil too loose.

These preliminaries will carry the farmer some length in directing a proper rotation of crops. Where dung, lime, or other manure, can be procured in plenty to recruit the soil after severe cropping, no rotation is more proper or profitable in a strong soil, than wheat, pease or beans, barley, oats, fallow. The whole farm may be brought under this rotation, except so far as hay is wanted. But as such command of manure is rare, it is of more importance to determine what should be the rotation when no manure can be procured but the dung collected in the farm. Considering that culmiferous crops are the more profitable in rich land, it would be proper to make them more frequent than the other kind. But as there are few soils in Scotland that will admit such frequent culmiferous crops without suffering, it may be laid down as a general rule, that alternate crops, culmiferous and leguminous, ought to form the rotation. Nor are there many soils that will stand good, even with this favourable rotation, unless relieved from time to time by pasturing a few years. If such extended rotation be artfully carried on, crops without end may be obtained in a tolerable good soil, without any manure but what is produced in the farm.

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The nature of soil considered with regard to the rotation of crops.

It is scarce necessary to be mentioned, being known to every farmer, that clay answers best for wheat, moist clay for beans, loam for barley and pease, light soil for turnip, sandy soil for rye and buck-wheat ; and that oats thrive better in coarse soil than any other grain. Now, in directing a rotation, it is not sufficient that a culmiferous crop be always succeeded by a leguminous : attention must be also given, that no crop be introduced that is unfit for the soil. Wheat, being a great binder, requires more than any other crop a leguminous crop to follow. But every such crop is not proper : potatoes are the greatest openers of soil ; but they are improper in a wheat-soil. Neither will turnip answer, because it requires a light soil. A very loose soil, after a crop of rye, requires ryegrass to bind it, or the treading of cattle in pasturing : but to bind the soil, wheat must not be ventured ; for it succeeds ill in loose soil.

Another consideration of moment in directing the rotation, is to avoid crops that encourage weeds. Pease is the fittest of all crops for succeeding to wheat, because it renders the ground loose and mellow, and the same soil agrees with both. But beware of pease, unless the soil be left by the wheat perfectly free of weeds ; because pease, if not an extraordinary crop, fosters weeds. Barley may be ventured after wheat, if the farmer be unwilling to lose a crop. It is indeed a robber ; better, however, any crop, than run the hazard of

poisoning the soil with weeds. But to prevent the necessity of barley after wheat, the land ought to be fallowed before the wheat : it cleans the ground thoroughly, and makes pease a secure crop after wheat. And after a good crop of pease, barley never fails. A horse-hoed crop of turnip is equal to a fallow for rooting out weeds ; but turnip does not suit land that is proper for wheat. Cabbage does well in wheat-soil ; and a horse-hoed crop of cabbage, which eradicates weeds, is a good preparation for wheat to be succeeded by pease ; and a crop of beans diligently hand-hoed, is in that view little inferior. As red clover requires the ground to be perfectly clean, a good crop of it ensures wheat, and next pease. In loam, a drilled crop of turnip or potatoes prepares the ground, equal to a fallow, for the same succession.

Another rule is, to avoid a frequent repetition of the same species ; for to produce good crops, change of species is no less necessary than change of feed. The same species returning every second or third year, will infallibly degenerate, and be a scanty crop. This is remarkably the case of red clover. Nor will our fields bear pleasantly perpetual crops of wheat after fallow, which is the practice of some English farmers.

Hitherto of rotation in the same field. We add one rule concerning rotation in different fields ; which is, to avoid crowding crops one after another in point of time ; but to chuse such as admit intervals sufficient for leisurely dressing, which gives opportunity to manage all with the same hands, and with the same cattle ; for example, beans in January or February, pease and oats in March, barley and potatoes in April, turnip in June or July, wheat and rye in October.

For illustrating the foregoing rules, a few instances of exceptionable rotations will not be thought amiss. The following is an usual rotation in Norfolk. First, wheat after red clover. Second, barley. Third, turnip. Fourth, barley with red clover. Fifth, clover cut for hay. Sixth, a second year's crop of clover commonly pastured. Dung is given to the wheat and turnip.—Against this rotation several objections lie. Barley after wheat is improper. The two crops of barley are too near together. The second crop of clover must be very bad, if pasturing be the best way of consuming it ; and if bad, it is a great encourager of weeds. But the strongest objection is, that red clover repeated so frequently in the same field cannot fail to degenerate ; and of this the Norfolk farmers begin to be sensible.—Salton in East Lothian is a clay soil ; and the rotation there is, Wheat after fallow and dung. Second, barley after two ploughings ; the one before winter, the other immediately before the seed is sown. Third, oats. Fourth, pease. Fifth, barley. Sixth, oats ; and then fallow. This rotation consists chiefly of robbing crops. Pease are the only leguminous crop, which even with the fallow is not sufficient to loosen a stiff soil. But the soil is good, which in some measure hides the badness of the rotation.—About Seaton, and all the way from Preston to Gosford, the ground is still more severely handled : wheat after fallow and dung, barley, oats, pease, wheat, barley, oats, and then another fallow. The soil is excellent ; and it ought indeed to be so, to support many rounds of such cropping.

In the parishes of Tranent, Aberlady, Dirleton, North-

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Exceptionable rotations.

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North-Berwick, and Athelstonefoord, the following rotations were formerly universal, and to this day are much more frequent than any other mode.

1. After fallow with dung, wheat, barley, oats, pease and beans, barley, oats, wheat.

2. After fallow and dung, barley, oats, pease and beans, wheat, barley, oats, pease, wheat.

3. After fallow and dung, wheat, oats, pease, barley, oats, wheat.

4. After fallow and dung, barley, oats, beans, wheat, pease, barley, oats.

In the several Tours of Young the itinerant farmer, are found, in the best counties of England, examples without end, of rotations no less exceptionable than many of those mentioned.

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Fields not
to be kept
too long in
pasture.

Where a field is laid down for pasture in order to be recruited, it is commonly left in that state many years; for it is the universal opinion, that the longer it lies, the richer it becomes for bearing corn. This may be true; but in order to determine the mode of cropping, the important point is, what upon the whole is the most profitable rotation; not what may produce luxuriant crops at a distant period. Upon that point, it may be affirmed, that the farmer who keeps a field in pasture beyond a certain time, loses every year considerably; and that a few luxuriant crops of corn, after twenty years of pasture, and still more after thirty, will not make up the loss.

Pasture-grass, while young, maintains many animals; and the field is greatly recruited by what they drop; it is even recruited by hay-crops, provided the grass be cut before feeding. But as old grass yields little profit, the field ought to be taken up for corn when the pasture begins to fail; and after a few crops, it ought to be laid down again with grass-seeds. Seduced by a chimerical notion, that a field, by frequent corn-crops, is fatigued and requires rest like a labouring man or animal, careful farmers give long rest to their fields by pasture, never adverting that it affords little profit. It ought to be their study, to improve their soil, by making it free, and also retentive of moisture; if they accomplish these ends, they need not be afraid of exhausting the soil by cropping.

143
Examples
of rotations.

Where a farmer has access to no manure but what is his own production, the case under consideration, there are various rotations of crops, all of them good though perhaps not equally so. We shall begin with two examples, one in clay, and one in free soil, each of the farms ninety acres. Six acres are to be inclosed for a kitchen-garden, in which there must be annually a crop of red clover, for summer-food to the working cattle. As there are annually twelve acres in hay, and twelve in pasture, a single plough with good cattle will be sufficient to command the remaining sixty acres.

Rotation in a clay soil.

Inclos.	1775.	1776.	1777.	1778.	1779.	1780.
1.	Fallow.	Wheat.	Pease.	Barley.	Hay.	Oats.
2.	Wheat.	Pease.	Barley.	Hay.	Oats.	Fallow.
3.	Pease.	Barley.	Hay.	Oats.	Fallow.	Wheat.
4.	Barley.	Hay.	Oats.	Fallow.	Wheat.	Pease.
5.	Hay.	Oats.	Fallow.	Wheat.	Pease.	Barley.
6.	Oats.	Fallow.	Wheat.	Pease.	Barley.	Hay.
7.	Pasture.	Pasture.	Pasture.	Pasture.	Pasture.	Pasture.

When the rotation is completed, the seventh inclosure having been six years in pasture, is ready to be taken up for a rotation of crops which begins with oats in the year 1781, and proceeds as in the sixth inclosure. In the same year 1781, the fifth inclosure is made pasture, for which it is prepared by sowing pasture grass seeds with the barley of the year 1780. And in this manner may the rotation be carried on without end. Here the labour is equally distributed; and there is no hurry nor confusion. But the chief property of this rotation is, that two culmiferous or white-corn crops are never found together; by a due mixture of crops, the soil is preserved in good heart without any adventitious manure. At the same time, the land is always producing plentiful crops: neither hay nor pasture get time to degenerate. The whole dung is laid upon the fallow.

Every farm that takes a grass-crop into the rotation must be inclosed, which is peculiarly necessary in a clay soil, as nothing is more hurtful to clay than poaching.

Rotation in a free soil.

Inclos.	1775.	1776.	1777.	1778.	1779.	1780.
1.	Turnip.	Barley.	Hay.	Oats.	Fallow.	Wheat.
2.	Barley.	Hay.	Oats.	Fallow.	Wheat.	Turnip.
3.	Hay.	Oats.	Fallow.	Wheat.	Turnip.	Barley.
4.	Oats.	Fallow.	Wheat.	Turnip.	Barley.	Hay.
5.	Fallow.	Wheat.	Turnip.	Barley.	Hay.	Oats.
6.	Wheat.	Turnip.	Barley.	Hay.	Oats.	Fallow.
7.	Pasture.	Pasture.	Pasture.	Pasture.	Pasture.	Pasture.

For the next rotation, the seventh inclosure is taken up for corn, beginning with an oat-crop, and proceeding in the order of the fourth inclosure; in place of which, the third inclosure is laid down for pasture by sowing pasture-grasses with the last crop in that inclosure, being barley. This rotation has all the advantages of the former. Here the dung is employed on the turnip-crop.

We proceed to consider what rotation is proper for carle clay. The farm we propose consists of seventy-three acres. Nine are to be inclosed for a kitchen garden, affording plenty of red clover to be cut green for the farm-cattle. The remaining sixty-four acres are divided into four inclosures, sixteen acres each, to be cropped as in the following table,

Inclos.	1775.	1776.	1777.	1778.
1.	Beans.	Barley.	Hay.	Oats.
2.	Barley.	Hay.	Oats.	Beans.
3.	Hay.	Oats.	Beans.	Barley.
4.	Oats.	Beans.	Barley.	Hay.

Here the dung ought to be applied to the barley.

Many other rotations may be contrived, keeping to the rules above laid down. Fallow, for example, wheat, pease and beans, barley, cabbage, oats, for clay. Here dung must be given both to the wheat and cabbage. For free soil, drilled turnip, barley, red clover, wheat upon a single furrow, drilled potatoes, oats. Both the turnip and potatoes must have dung. Another for free soil: turnip drilled and dunged, red clover, wheat on a single furrow with dung, pease, barley, potatoes, oats.

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Oats. The following rotation has proved successful in a soil proper for wheat. 1. Oats with red clover, after fallow, without dung. 2. Hay. The clover-stubble dunged, and wheat sown the end of October with a single furrow. 3. Wheat. 4. Pease. 5. Barley. Fallow again. Oats are taken the first crop, to save the dung for the wheat. Oats always thrive on a fallow, though without dung, which is not the case of barley. But barley seldom fails after pease. In strong clay soil, the following rotation answers. 1. Wheat after fallow and dung. 2. Beans sown under furrow as early as possible. Above the beans, sow pease end of March, half a boll per acre, and harrow them in. The two grains will ripen at the same time. 3. Oats or barley on a winter-furrow with grafs-seeds. 4. Hay for one year or two; the second growth pastured. Lay what dung can be spared on the hay-stubble, and sow wheat with a single furrow. 5. Wheat. 6. Beans or pease. 7. Oats. Fallow again.

SECT. VI. Of Reaping Corn and Hay Crops, and Storing them up for use.

¹⁴⁸
Of ripeness.

CULMIFEROUS plants are ripe when the stem is totally white: they are not fully ripe if any green streaks remain. Some farmers are of opinion, that wheat ought to be cut before it is fully ripe. Their reasons are, first, that ripe wheat is apt to shake; and next, that the flour is not so good. With respect to the last, it is contrary to nature, that any seed can be better in an unripe state, than when brought to perfection: nor will it be found so upon trial. With respect to the first, wheat, at the point of perfection, is not more apt to shake than for some days before: the husk begins not to open till after the seed is fully ripe; and then the suffering the crop to stand becomes ticklish: after the minute of ripening, it should be cut down in an instant, if possible.

¹⁴⁸
Of reapers.

This leads to the hands that are commonly engaged to cut down corn. In Scotland, the universal practice was, to provide a number of hands, in proportion to the extent of the crop, without regard to the time of ripening. By this method, the reapers were often idle for want of work; and what is much worse, they had often more work than they could overtake, and ripe fields were laid open to shaking winds. The Lothians have long enjoyed weekly markets for reapers, where a farmer can provide himself with the number he wants; and this practice is creeping into neighbouring shires. Where there is no opportunity of such markets, neighbouring farmers ought to agree in borrowing and lending their reapers.

One should imagine, that a caution against cutting corn when wet, is unnecessary; yet from the impatience of farmers to prevent shaking, no caveat is more so. Why do they not consider, that corn standing dries in half a day; when, in a close sheaf, the weather must be favourable if it dry in a month? in moist weather it will never dry.

¹⁴⁶
Manner of cutting.

With respect to the manner of cutting, we must premise, that barley is of all the most difficult grain to be dried for keeping. Having no husk, rain has easy access; and it has a tendency to malten when wet. Where the ground is properly smoothed by rolling, it seems best to cut it down with the fythe. This manner being more expeditious than the sickle, removes it

sooner from danger of wind; and gives a third more straw, which is a capital article for dung, where a farm is at a distance from other manure. We except only corn that has lodged; for there the sickle is more convenient than the fythe. As it ought to be dry when cut, bind it up directly: if allowed to lie any time in the swath, it is apt to be discoloured.—Barley sown with grafs-seeds, red clover especially, requires a different management. Where the grafs is cut along with it, the difficulty is great of getting it so dry as to be ventured in a stack. The best way is, to cut the barley with a sickle above the clover, so as that nothing but clean barley is bound up. Cut with a fythe the stubble and grafs: they make excellent winter-food. The same method is applicable to oats; with this only difference, that when the field is exposed to the south-west wind, it is less necessary to bind immediately after mowing. As wheat commonly grows higher than any other grain, it is difficult to manage it with the fythe; for which reason the sickle is preferred in England. Pease and beans grow so irregularly, as to make the sickle necessary.

¹⁴⁷
Drying of Pease.

The best way for drying pease, is to keep separate the handfuls that are cut: though in this way they wet easily, they dry as soon. In the common way of heaping pease together for composing a sheaf, they wet as easily, and dry not near so soon. With respect to beans, the top of the handful last cut, ought to be laid on the bottom of the former; which gives ready access to the wind. By this method pease and beans are ready for the stack in half the ordinary time.

¹⁴⁹
Size of sheaves.

A sheaf commonly is made as large as can be contained in two lengths of the corn made into a rope. To save frequent tying, the binder presses it down with his knee, and binds it so hard as totally to exclude the air. If there be any moisture in the crop, which seldom fails, a process of fermentation and putrefaction commences in the sheaf; which is perfected in the stack, to the destruction both of corn and straw. How stupid is it, to make the size of a sheaf depend on the height of the plants! By that rule, a wheat-sheaf is commonly so weighty, as to be unmanageable by ordinary arms: it requires an effort to move it, that frequently bursts the knot, and occasions loss of grain, beside the trouble of a second tying. Sheaves ought never to be larger than can be contained in one length of the plant, cut close to the ground; without admitting any exception, if the plants be above eighteen inches high. The binder's arm can then compress the sheaf sufficiently, without need of his knee. The additional hands that this way of binding may require, are not to be regarded, compared with the advantage of drying soon. Corn thus managed may be ready for the stack in a week; it seldom in the ordinary way requires less than a fortnight, and frequently longer. Of a small sheaf compressed by the arm only, the air pervades every part; nor is it so apt to be unloosed as a large sheaf, however firmly bound. We omit the gathering of sheaves into shocks, because the common method is good, which is to place the shocks directed to the south-west, in order to resist the force of the wind. Five sheaves on each side make a sufficient stay; and a greater number cannot be covered with two head-sheaves.

¹⁴⁹
Carrying off the victual harvest.

Every article is of importance that hastens the operation in a country, like Scotland, subjected to unequal harvest.

PRACTICE harvest-weather; for which reason, the most expeditious method should be chosen for carrying corn from the field to the stack-yard. Our carriages are generally too small or too large. A sledge is a very awkward machine; many hands are required, and little progress made. Waggon and large carts are little less dilatory, as they must stand in the yard till unloaded sheaf by sheaf. The best way is, to use long carts moveable upon the axle, so as at once to throw the whole load on the ground; which is forked up to the stack by a hand appointed for that purpose. By this method, two carts will do the work of four or five.

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of stacking. Building round stacks in the yard is undoubtedly preferable to housing corn. There it is shut up from the air; and it must be exceedingly dry, if it contract not a multitudes, which is the first step to putrefaction. Add to this, that in the yard, a stack is preserved from rats and mice by being set on a pedestal; whereas no method has hitherto been invented for preserving corn in a house from such destructive vermin. The proper manner of building, is to make every sheaf incline downward from its top to its bottom. Where the sheaves are laid horizontally, the stack will take in rain both above and below. The best form of a stack is that of a cone placed on a cylinder; and the top of the cone should be formed with three sheaves drawn to a point. If the upper part of the cylinder be a little wider than the under, so much the better.

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covering
the stacks. The delaying to cover a stack for two or three weeks, though common, is, however, exceedingly absurd; for if much rain fall in the interim, it is beyond the power of wind to dry the stack. Vegetation begun in the external parts, shuts out the air from the internal; and to prevent a total putrefaction, the stack must be thrown down, and exposed to the air, every sheaf. In order to have a stack covered the moment it is finished, straw and ropes ought to be ready; and the covering ought to be so thick as to be proof against rain.

Scotland is subject not only to floods of rain, but to high winds. Good covering guards against the former, and ropes artfully applied guards against the latter. The following is a good mode. Take a hay-ropes well twisted, and surround the stack with it, two feet or so below the top. Surround the stack with another such rope immediately below the easing. Connect these two with ropes in an up-and-down position, distant from each other at the easing about five or six feet. Then surround the stack with other circular ropes parallel to the two first mentioned, giving them a twist round every one of those that lie up-and-down, by which the whole will be connected together in a sort of net-work. What remains is, to finish the two feet at the top of the stack. Let it be covered with bunches of straw laid regularly up and down; the under part to be put under the circular rope first mentioned, which will keep it fast, and the upper part be bound by a small rope artfully twisted, commonly called the *crown of the stack*. This method is preferable to the common way of laying long ropes over the top of the stack, and tying them to the belting-rope; which flattens the top, and makes it take in rain. A stack covered in the way here described, will stand two years secure both against wind and rain; a notable advantage in this variable climate.

The great aim in making hay is, to preserve as much of the sap as possible. All agree in this; and yet differ widely in the means of making that aim effectual. To describe all the different means would be equally tedious and unprofitable. We shall confine ourselves to two, which appear preferable to all others. A crop of rye-grass and yellow clover ought to be spread as cut. A day or two after, when the dew is evaporated, rake it into a number of parallel rows along the field, termed *wind-rows*, for the convenience of putting it up into small cocks. After turning the rows once and again, make small cocks weighing a stone or two. At the distance of two days or so, put two cocks into one, observing always to mix the tops and bottoms together, and to take a new place for each cock, that the least damage possible may be done to the grass. Proceed in putting two cocks into one, till sufficiently dry for tramp-ricks of 100 stone each. The easiest way of erecting tramp-ricks, is to found a rick in the middle of the row of cocks that are to compose it. The cocks may be carried to the rick by two persons joining arms together. When all the cocks are thus carried to the rick within the distance of forty yards or so, the rest of the cocks will be more expeditiously carried to the rick, by a rope wound about them and dragged by a horse. Two ropes are sufficient to secure the ricks from wind, the short time they are to stand in the field. In the year 1775, 10,000 stone were put into tramp-ricks the fourth day after cutting. In a country so wet as many parts of Scotland are, expedition is of mighty consequence in the drying both of hay and corn. With respect to hay intended for horned cattle, it is by the generality held an improvement, that it be heated a little in the stack. But we violently suspect this doctrine to have been invented for excusing indolent management. An ox, it is true, will eat such hay; but it will always be found that he prefers sweet hay; and it cannot well be doubted, but that such hay is the most salutary and the most nourishing.

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Hay of red clover. The making hay consisting chiefly of red clover, requires more care. The season of cutting is the last week of June, when it is in full bloom: earlier it may be cut, but never later. To cut it later, would indeed produce a weightier crop; but a late first cutting makes the second also late, perhaps too late for drying. At the same time, the want of weight in an early first cutting, is amply compensated by the weight of the second.

When the season is too variable for making hay of the second growth, mix straw with that growth, which will be a substantial food for cattle during winter. This is commonly done by laying strata of the straw and clover alternately in the stack. But by this method, the strata of clover, if they do not heat, turn mouldy at least, and unpalatable. The better way is, to mix them carefully with the hand before they be put into the stack. The dry straw imbibes moisture from the clover and prevents heating.

But the best method of hay-making seems to be that recommended by Mr Anderion *. "Intead," says he, "of allowing the hay to lie, as usual in most places, for some days in the swathe after it is cut, and afterwards alternately putting it up into cocks and spreading it out, and treading it in the sun, which tends greatly to bleach the hay, exhales its natural juices, and subjects

PRACTICE**154**
Hay-making.**154**
Other method.
* *Essays on Agriculture*, vol. I p. 186.

PRACTICE subjects it very much to the danger of getting rain, and thus runs a great risk of being good for little, I make it a general rule, if possible; never to cut hay but when the grafs is quite dry; and then make the gatherers follow close upon the cutters,—putting it up immediately into small cocks about three feet high each when new put up, and of as small a diameter as they can be made to stand with; always giving each of them a slight kind of thatching, by drawing a few handfuls of the hay from the bottom of the cock all around, and laying it lightly upon the top with one of the ends hanging downwards. This is done with the utmost ease and expedition; and when it is once in that state, I consider my hay as in a great measure out of danger: for unless a violent wind should arise immediately after the cocks are put up, so as to overturn them, nothing else can hurt the hay; as I have often experienced, that no rain, however violent, ever penetrates into these cocks but for a very little way. And, if they are dry put up, they never fit together so closely as to heat; although they acquire, in a day or two, such a degree of firmness, as to be in no danger of being overturned by wind after that time, unless it blows a hurricane.

“In these cocks, I allow the hay to remain, until, upon inspection, I judge that it will keep in pretty large tramp-cocks, (which is usually in one or two weeks, according as the weather is more or less favourable, when two men, each with a long pronged pitchfork, lift up one of these small cocks between them with the greatest ease, and carry them one after another to the place where the tramp-cock is to be built (D); and in this manner, they proceed over the field till the whole is finished.

¹⁵⁵
Advantages
of this method.

“The advantages that attend this method of making hay, are, That it greatly abridges the labour; as it does not require above the one half of the work that is necessary in the old method of turning and tedding it: That it allows the hay to continue almost as green as when it is cut, and preserves its natural juices in the greatest perfection; for, unless it be the little that is exposed to the sun and air upon the surface of the cocks, which is no more bleached than every straw of hay saved in the ordinary way, the whole is dried in the most slow and equal manner that could be desired: and, lastly, That it is thus in a great measure secured from almost the possibility of being damaged by rain. This last circumstance deserves to be much more attended to by the farmer than it usually is at present; as I have seen few who are sufficiently aware of the loss that the quality of their hay sustains by receiving a slight shower after it is cut, and before it is gathered; the generality of farmers seeming to be very well satisfied if they get in their hay without being absolutely rotted; never paying the least attention to its having been several times wetted while the hay was making. But, if these gentlemen will take the trouble at any time to compare any parcel of hay that has been made perfectly dry, with another parcel from the same field

that has received a shower while in the swathe, or even a copious dew, they will soon be sensible of a very manifest difference between them; nor will their horses or cattle ever commit a mistake in chusing between the two.

“Let it be particularly remarked, that in this manner of making hay, great care must be taken that it be dry when first put into the cocks; for, if it is in the least degree wet at that time, it will turn instantly mouldy, and fit together so as to become totally impervious to the air, and will never afterwards become dry till it is spread out to the sun. For this reason, if at any time during a course of good settled weather you should begin to cut in the morning before the dew is off the grafs, keep back the gatherers till the dew is evaporated; allowing that which was first cut to lie till it is dry before it is cocked. In this case, you will almost always find that the uncut grafs will dry sooner than that which has been cut when wet; and, therefore, the gatherers may always begin to put up that which is fresh cut before the other; which will usually require two or three hours to dry after the new-cut hay may be cocked. And if, at any time, in case of necessity, you should be obliged to cut your hay before it is dry, the same rule must be observed, always to allow it to remain in the swathe till it is quite dry: but, as there is always a great risk of being long in getting it up, and as it never in this case *ruins* (E) so kindly as if it had been dry cut, the farmer ought to endeavour, if possible, in all cases, to cut his hay only when dry; even if it should cost him some additional expence to the cutters, by keeping them employed at any other work, or even allowing them to remain idle, if the weather should be variable or rainy.

¹⁵⁶
Particular
caution re-
quisite in
this method.

“But if there is a great proportion of clover, and the weather should chance be close and calm at the time, it may, on some occasions, be necessary to open up these cocks a little, to admit some fresh air into them; in which case, after they have stood a day or two, it may be of great use to turn these cocks and open them up a little, which ought to be done in the driest time of the day; the operator taking that part of each cock which was the top, and with it forming the base of a new one, so that the part which was most exposed to the air becomes excluded from it, and that which was underneath comes to be placed upon the top, so as to make it all dry as equally as possible.

“If the hay has not been damp when it was first put up, the cock may be immediately finished out at once; but if it is at all wet, it will be of great use to turn over only a little of the top of the cock at first, and leaving it in that state to dry a little, proceed to another, and a third, and fourth, &c. treating each in the same way; going on in that manner till you find that the inside of the first opened cock is sufficiently dried, when it will be proper to return to it, turning over a little more of it till you come to what is still damp, when you leave it and proceed to another, and so

(N) If the hay is to be carried to any considerable distance, this part of the labour may be greatly abridged, by causing the carriers take two long sticks of a sufficient strength, and having laid them down by the small cocks parallel to one another, at the distance of one and a half, or two feet asunder, let them lift three or four cocks, one after another, and place them carefully above the sticks, and then carry them all together, as if upon a hand-barrow, to the place where the large rick is to be built.

(E) By *winning* hay, is meant the operation by which it is brought from the succulent state of grafs to that of a dry fodder.

PRACTICE so on round the whole; always returning afresh till the cocks are entirely finished. This is the best way of saving your hay, if you have been under the necessity of cutting it while damp; but, it is always best to guard against this inconvenience, if possible."

¹⁵⁷ Hay-stacks. In the yard, a stack of hay ought to be an oblong square, if the quantity be greater than to be easily flowed in a round stack; because a smaller surface is exposed to the air, than in a number of round stacks. For the same reason, a stack of pease ought to have the same form, the straw being more valuable than that of oats, wheat, or barley. The moment a stack is finished, it ought to be covered; because the surface-hay is much damaged by withering in dry weather, and moistening in wet weather. Let it have a pavilion-roof; for more of it can be covered with straw in that shape, than when built perpendicular at the ends. Let it be roped as directed above for corn-stacks; with this difference only, that in an oblong square the ropes must be thrown over the top, and tied to the belt-rope below. This belt-rope ought to be fixed with pins to the stack: the reason is, that the ropes thrown over the stack will bag by the sinking of the stack, and may be drawn tight by lowering the belt-rope, and fixing it in its new position with the same pins.

The stems of hopes, being long and tough, make excellent ropes; and it will be a saving article, to propagate a few plants of that kind for that very end.

A stack of ryegrass hay, a year old, and of a moderate size, will weigh, each cubic yard, 11 Dutch stone. A stack of clover-hay in the same circumstances weighs somewhat less.

SECT. VII. Manures.

The manures commonly used are dung, lime, shell-marl, clay-marl, and stone-marl. Many other substances are used; shavings of horn, for example, refuse of malt, and even old rags: but as the quantity that can be procured is inconsiderable, and as their application is simple, we shall confume no time upon them.

¹⁵⁸ Dung. Dung is the chief of all manures; because a quantity of it may be collected in every farm, and because it makes the quickest return. A field sufficiently dunged, will produce good crops four or five years.

Dung of animals that chew the cud, being more thoroughly putrefied than that of others, is fit to be mixed with the soil without needing to be collected into a dunghill. A horse does not chew the cud; and in horse-dung may be perceived straw or ryegrass broken into small parts, but not dissolved: it is proper therefore that the putrefaction be completed in a dunghill. It ought to be mixed there with cool materials: so hot it is, that, in a dunghill by itself, it fuses and burns instead of putrefying. The difference between the dung of a horse and of a horned animal, is visible in a pasture-field: the grass round the former is withered; round the latter, it is ranker and more verdant than in the rest of the field. A mixture of dry and moist stuff, ought to be studied: the former attracting moisture from the latter, they become equally moist.

¹⁵⁹ Of a dung-hill. To prevent sap from running out of a dunghill, its situation should be a little below the surface; and to prevent rain from running into it, it should be surrounded with a ring of sod. If the soil on which the

PRACTICE dunghill stands be porous, let it be paved, to prevent the sap from sinking into the ground. If moisture happen to superabound, it may be led off by a small gutter to impregnate a quantity of rich mould laid down to receive it, which will make it equal to good dung.

Straw should be prepared for the dunghill, by being laid under cattle, and sufficiently moistened. When laid dry into a dunghill, it keeps it open, admits too much air, and prevents putrefaction.

Dung from the stable ought to be carefully spread on the dunghill, and mixed with the former dung. When left in heaps upon the dunghill, fermentation and putrefaction go on unequally.

Complete putrefaction is of importance with regard to the seed of weeds that are in the dunghill: if they remain found, they are carried out with the dung, and infest the ground. Complete putrefaction is of still greater importance by pulverising the dung; in which condition it mixes intimately with the soil, and operates the most powerfully. In land intended for barley, undigested dung has a very bad effect: it keeps the ground open, admits drought, and prevents the seed from springing. On the other hand, when thoroughly rotted, it mixes with the soil, and enables it to retain moisture.

It follows, that the properest time for dunging a field, is in its highest pulverisation; at which time the earth mixes intimately with the dung. Immediately before setting cabbage, sowing turnip, or wheat, is a good time. Dung divides and spreads the most accurately when moist. Its intimate mixture with the soil is of such importance, that hands should be employed to divide and spread any lumps that may be in it.

¹⁶⁰ Time for dunging. Dung should be spread, and ploughed into the ground, without delay. When a heap lies two or three weeks, some of the moisture is imbibed into the ground, which will produce tufts of corn more vigorous than in the rest of the field. There cannot be a worse practice than to lead out dung before winter, leaving it exposed to frost and snow. The whole spirit of the dung is extracted by rain, and carried off with it. The dung divested of its sap becomes dry in spring, and incapable of being mixed with the mould. It is turned over whole by the plough, and buried in the furrow.

¹⁶¹ Manner of dunging. As dung is an article of the utmost importance in Of husbandry, one should imagine, that the collecting it would be a capital article with an industrious farmer. Yet an ingenious writer, observing that the Jamaicans are in this particular much more indutious than the British, ascribes the difference to the difficulty of procuring dung in Jamaica. "In England, where the long winter enables a farmer to raise what quantity he pleases, it is not collected with any degree of industry. But in Jamaica, where there is no winter, and where the heat of the sun is a great obstruction, the farmer must be indefatigable, or he will never raise any dung." Cool interest is not alone a sufficient motive with the indolent, to be active. As dung is of great importance in husbandry, a farmer cannot be too assiduous in collecting animal and vegetable substances that will rot. One article of that kind there is, to collect which there is a double motive, and yet is neglected almost every where. A farm full of weeds is a nuisance to the neighbourhood: it poisons the fields around; and the possessor ought to be disgraced

PRACTICE

PRACTICE

graced as a pest to society. Now the cutting down every weed before the feed is formed, answers two excellent purposes. First, it encourages good crops, by keeping the ground clean. Next, these weeds mixed with other materials in a dunghill, may add considerably to the quantity of dung.

163
Of lime.

Next of lime, which is a profitable manure, and greatly so when it can be got in plenty within a moderate distance. The benefit of lime is so visible, that the use of it has become general, where the price and carriage are in any degree moderate.

164
Its operation.

However people may differ in other particulars, all agree, that the operation of lime depends on its intimate mixture with the soil; and therefore that the proper time of applying it, is when it is perfectly powdered and the soil at the same time in the highest degree of pulverification. Lime of itself is absolutely barren; and yet it enriches a barren soil. Neither of the two produces any good effect without the other; and consequently, the more intimately they are mixed, the effect must be the greater.

Hence it follows, that lime ought always to be slaked with a proper quantity of water, because by that means it is reduced the most effectually into powder. Lime left to be slaked by a moist air, or accidental rain, is seldom or never thoroughly reduced into powder; and therefore can never be intimately mixed with the soil. Sometimes an opportunity offers to bring home shell-lime before the ground is ready for it; and it is commonly thrown into a heap without cover, trusting to rain for slaking. The proper way is, to lay the shell-lime in different heaps on the ground where it is to be spread, to reduce these heaps into powder by slaking with water, and to cover the slaked lime with sod so as to defend it from rain. One however would avoid as much as possible the bringing home lime before the ground be ready for it. Where allowed to lie long in a heap, there are two bad consequences: first, lime attracts moisture, even though well covered, and runs into clots, which prevents an intimate mixture; and, next, we know, that burnt limestone, whether in shells or in powder, returns gradually into its original state of limestone; and upon that account also, is less capable of being mixt with the soil. And this is verified by a fact, that, after lying long, it is so hard bound together as to require a pick to separate the parts.

For the same reason, it is a bad practice, though common, to let spread lime lie on the surface all winter. The bad effects abovementioned take place here in part: and there is another; that rain washes the lime down to the furrows, and in a hanging field carries the whole away.

165
Time of liming.

As the particles of powdered lime are both small and heavy, they quickly sink to the bottom of the furrow, if care be not taken to prevent it. In that view, it is a rule, that lime be spread, and mixed with the soil, immediately before sowing, or along with the seed. In this manner of application, there being no occasion to move it till the ground be stirred for a new crop, it has time to incorporate with the soil, and does not readily separate from it. Thus, if turnip-feed is to be sown broadcast, the lime ought to be laid on immediately before sowing, and harrowed in with the feed. If a crop of drilled turnip or cabbage be intended, the lime ought to be spread immediately before forming in

drills. With respect to wheat, the lime ought to be spread immediately before feed-furrowing. If spread more early, before the ground be sufficiently broken, it sinks to the bottom. If a light soil be prepared for barley, the lime ought to be spread after feed-furrowing, and harrowed in with the feed. In a strong soil, it sinks not so readily to the bottom; and therefore, before sowing the barley, the lime ought to be mixed with the soil by a brake. Where moor is summer-fallowed for a crop of oats next year, the lime ought to be laid on immediately before the last ploughing, and braked in as before. It has sufficient time to incorporate with the soil before the land be stirred again.

166
Quantity.

The quantity to be laid on, depends on the nature of the soil. Upon a strong soil, seventy or eighty bolls of shells are not more than sufficient, reckoning four small firlots to the boll, termed *wheat-measure*; nor will it be an overdose to lay on an hundred bolls. Between fifty and sixty may suffice upon medium soils; and upon the thin or gravelly, between thirty and forty. It is not safe to lay a much greater quantity on such soils.

167
Liming pasture-fields.

It is common to lime a pasture-field immediately before ploughing. This is an unsafe practice; it is thrown to the bottom of the furrow, from which it is never fully gathered up. The proper time for liming a pasture field, intended to be taken up for corn, is a year at least, or two, before ploughing. It is washed in by rain among the roots of plants, and has time to incorporate with the soil.

Limestone beat small, makes an excellent manure; and supplies the want of powdered lime, where there is no fuel to burn the limestone. Limestone beat small has not hitherto been much used as a manure; and the proportion between it and powdered lime has not been ascertained. What follows may give some light. Three pounds of raw lime is by burning reduced to two pounds of shell-lime. Yet nothing is expelled by the fire but the air that was in the limestone: the calcareous earth remains entire. *Ergo*, two pounds of shell-lime contain as much calcareous earth as three pounds of raw limestone. Shell-lime of the best quality, when slaked with water, will measure out to thrice the quantity. But as limestone loses none of its bulk by being burnt into shells, it follows, that three bushels of raw limestone contain as much calcareous earth as six bushels of powdered lime; and consequently, if powdered lime posesses not some virtue above raw limestone, three bushels of the latter beat small should equal as a manure six bushels of the former.

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Beat lime.

Shell-marl, as a manure, is managed in every respect like powdered lime; with this only difference, that a fifth or a fourth part more in measure ought to be given. The reason is, that shell-marl is less weighty than lime; and that a boll of it contains less calcareous earth, which is the fructifying part of both.

169
Of shell-marl.

Clay and stone marls, with respect to husbandry, are the same, though in appearance different.

The goodness of marl depends on the quantity of calcareous earth in it: which has been known to amount to a half or more. It is too expensive if the quantity be less than a third or a fourth part. Good marl is the most substantial of all manures; because it improves the weakest ground to equal the best borough-acres. The low part of Berwickshire termed *the Merse*, abounds

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Of clay and stone-marls.

every

PRACTICE every where with this marl; and is the only county in Scotland where it is in plenty.

Land ought to be cleared of weeds before marling; and it ought to be smoothed with the brake and harrow, in order that the marl may be equally spread. Marl is a soil on which no vegetable will grow; its efficacy depends, like that of lime, on its pulverisation, and intimate mixture with the soil. Toward the former, alternate drought and moisture contribute greatly, as also frost. Therefore, after being evenly spread, it ought to lie on the surface all winter. In the month of October, it may be roused with a brake; which will bring to the surface, and expose to the air and frost, all the hard parts, and mix with the soil all that is powdered. In that respect it differs widely from dung and lime, which ought to be ploughed into the ground without delay. Oats is a hardy grain, which will answer for being the first crop after marling, better than any other; and it will succeed though the marl be not thoroughly mixed with the soil. In that case, the marl ought to be ploughed in with an ebb furrow immediately before sowing, and braked thoroughly. It is ticklish to make wheat the first crop: if sown before winter, frost swells the marl, and is apt to throw the seed out of the ground; if sown in spring, it will suffer more than oats by want of due mixture.

Summer is the proper season for marling; because in that season the marl, being dry, is not only lighter, but is easily reduced to powder. Frost however is not improper for marling; especially as in frost there is little opportunity for any other work.

Marl is a heavy body, and sinks to the bottom of the furrow, if indifferently ploughed. Therefore the first crop should always have an ebb furrow. During the growing of that crop, the marl has time to incorporate with the soil, and to become a part of it; after which it does not readily separate.

SECT. VIII. Principles and Operations of the New or Horse-hoeing Husbandry.

THE general properties attributed to the new husbandry may be reduced to two, *viz.* the promoting the growth of plants by hoeing, and the saving of seed; both of which are equally profitable to the farmer.

The advantages of tillage before sowing have already been pointed out. In this place we must confine ourselves to the utility of tillage after sowing. This kind of tillage is most generally known by the name of *horse-hoeing*.

Land sowed with wheat, however well it may be cultivated in autumn, sinks in the winter; the particles get nearer together, and the weeds rise; so that in spring, the land is nearly in the same situation as if it never had been ploughed. This, however, is the season when it should branch and grow with most vigour; and consequently stands most in need of ploughing or hoeing, to destroy the weeds, to supply the roots with fresh earth, and, by dividing anew the particles of the soil, to allow the roots to extend and collect nourishment.

It is well known, that, in gardens, plants grow with double vigour after being hoed or transplanted. If plants growing in arable land could be managed with care and safety in this manner, it is natural to expect, that their growth would be promoted accordingly. Experience shows, that this is not only practicable, but attended with many advantages.

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In the operation of hoeing wheat, though some of the roots be moved or broken, the plants receive no injury; for this very circumstance makes them send forth a greater number of roots than formerly, which enlarge their pasture, and consequently augment their growth.

Sickly wheat has often recovered its vigour after a good hoeing, especially when performed in weather not very hot or dry.

Wheat, and such grain as is sown before winter, requires hoeing more than oats, barley, or other grain sown in the spring; for, if the land has been well ploughed before the sowing of spring-corn, it neither has time to harden, nor to produce many weeds, not having been exposed to the winter's snow and rain.

OF SOWING.

As, in the practice of the new husbandry, plants grow with greater vigour than by the old method, the land should be sowed thinner. It is this principle of the new husbandry that has been chiefly objected to; for, upon observing the land occupied by a small number of plants, people are apt to look upon all the vacant space as lost. But this prejudice will soon be removed, when it is considered, that, in the best land cultivated in the common method, and sown very thick, each seed produces but one or two ears; that, in the same land sown thinner, every seed produces two or three ears; and that a single seed sometimes produces 18 or 21 ears.

In the common method, as there are many more plants than can find sufficient nourishment, and as it is impossible to assist them by hoeing, numbers die before they attain maturity, the greatest part remain sickly and drooping; and thus part of the seed is lost. On the contrary, in the new method, all the plants have as much food as they require; and as they are, from time to time, assisted by hoeing, they become so vigorous as to equal in their production the numerous but sickly plants cultivated in the common method.

OF HOEING.

THE new husbandry is absolutely impracticable in lands that are not easily ploughed. Attempting to cultivate land according to this husbandry, without attending to this circumstance, that it is practicable in no land excepting such as have already been brought into good tilth by the old method, has gone far to make it contemptible in many places.

When a field is in good tilth, it should be sown so thin as to leave sufficient room for the plants to extend their roots. After being well ploughed and harrowed, it must be divided into rows, at the distance of thirty inches from one another. On the sides of each of these rows, two rows of wheat must be sowed six inches distant from each other. By this means there will be an interval of two feet wide betwixt the rows, and every plant will have room enough to extend its roots, and to supply it with food. The intervals will likewise be sufficient for allowing the earth to be hoed or tilled without injuring the plants in the rows.

The first hoeing, which should be given before the winter, is intended to drain away the wet, and to dispose the earth to be mellowed by the frosts. These two ends will be answered by drawing two small furrows at a little distance from the rows, and throwing

Y the

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Advantages
ascribed to
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ing.

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Method of
sowing in
the New
Husbandry.

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The differ-
ent hoe-
ings.

the earth taken from the furrows into the middle of the intervals. This first hoeing should be given when the wheat is in leaf.

The second hoeing, which is intended to make the plants branch, should be given after the hard frosts are over. To do this with advantage, after stirring the earth a little, near the rows, the earth which was thrown in the middle of the intervals should be turned back into the furrows. This earth, having been mellowed by the winter, supplies the plants with excellent food, and makes the roots extend.

The third hoeing, which is intended to invigorate the stalk, should be given when the ears of the corn begin to shew themselves. This hoeing may, however, be very slight.

But the last hoeing is of the greatest importance, as it enlarges the grain, and makes the ears fill at their extremities. This hoeing should be given when the wheat is in bloom; a furrow must be drawn in the middle of the interval, and the earth thrown to the right and left on the foot of the plants. This supports the plants, prevents them from being laid, and prepares the ground for the next sowing, as the seed is then to be put in the middle of the ground that formed the intervals.

By this successive tillage, or hoeing, good crops will be obtained, provided the weather is not very unfavourable.

But as strong, vigorous plants are longer before they arrive at maturity, corn raised in the new way is later in ripening than any other, and must therefore be sown earlier.

In order to prepare the intervals for sowing again, some well-rotted dung may be laid in the deep furrows made in the middle of the intervals; and this dung must be covered with the earth that was before thrown towards the rows of wheat. But, if the land does not require mending, the deep furrow is filled without any dung. This operation should be performed immediately after harvest, that there may be time to give the land a slight stirring before the rows are sowed; which should occupy the middle of the space which formed the intervals during the last crop. The intervals of the second year take up the space occupied by the stubble of the first.

Supposing dung to be necessary, which is denied by many, a very small quantity is sufficient; a single layer, put in the bottom of each furrow, will be enough.

DESCRIPTION of the INSTRUMENTS commonly used in the NEW HUSBANDRY.

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Instruments
described.
Plate VI.

Fig. 1. is a marking plough. The principal use of this plough is to straighten and regulate the ridges. The first line is traced by the eye, by means of three poles, placed in a straight line. The plough draws the first furrow in the direction of this line; and, at the same time, with the tooth A, fixed in the block of wood near the end of the cross-poll or slider B B, marks the breadth of the ridge at the distance intended. The ploughman next traces the second line or rutt made by the tooth, and draws a small furrow along it; and continues in this manner till the whole field is laid out in straight and equidistant ridges.

Fig. 2. is a plough for breaking up lee, or turning up the bottom of land when greatly exhausted. By its construction, the width and depth of the furrows can

be regulated to a greater certainty than by any other hitherto known in this country. Its appearance is heavy; but two horses are sufficient to plough with it in ordinary free land; and only four are necessary in the stiffest clay-foils. This plough is likewise easily held and tempered. A, is the sword fixed in the fizers B, which runs thro' a mortoise E, at the end of the beam C, and regulates the depth of the furrow by raising or depressing the beam; it is fixed by putting the pin D thro' the beam and sword, and is moveable at E.

Fig. 3. is a jointed brake-harrow with 24 teeth, shaped like coulters, and standing at about an angle of 80 degrees. By this instrument the land is finely pulverised, and prepared for receiving the seed from the drill. It requires four horses in stiff, and two in open, land. This harrow is likewise used for levelling the ridges; which is done by preffing it down by the handles where the ridge is high, and raising it up when low.

Fig. 4. is an angular weeding-harrow, which may follow the brake when necessary. The seven hindmoit teeth should stand at a more acute angle than the rest, in order to collect the weeds, which the holder can drop at pleasure, by raising the hinder part, which is fixed to the body of the harrow by two joints.

Fig. 5. is a pair of harrows with shafts. This harrow is used for covering the seed in the drills, the horse going in the furrow.

Fig. 6. is a drill-plough, constructed in such a manner as to sow at once two rows of beans, peas, or wheat. This machine is easily wrought by two horses. A, is the happer for containing the seed; B, circular boxes for receiving the seed from the happer; C C, two square boxes which receive the seed from small holes in the circular boxes, as they turn round; and last of all, the seed is dropped into the drills through holes in the square boxes, behind the coulters D. The cylinder E follows, which, together with the wheel F, regulates the depth of the coulters, and covers the seed; the harrow G comes behind all, and covers the seed more completely. H H, two sliders, which, when drawn out, prevent the seed from falling into the boxes; and, I, is a ketch which holds the rungs, and prevents the boxes from turning, and losing seed at the ends of the ridges.

Fig. 7. is a single hoe-plough of a very simple construction, by which the earth in the intervals is stirred and laid up on both sides to the roots of the plants, and at the same time the weeds are destroyed. A A the mould-boards, which may be raised or depressed at pleasure, according as the farmer wants to throw the earth higher or lower upon the roots.

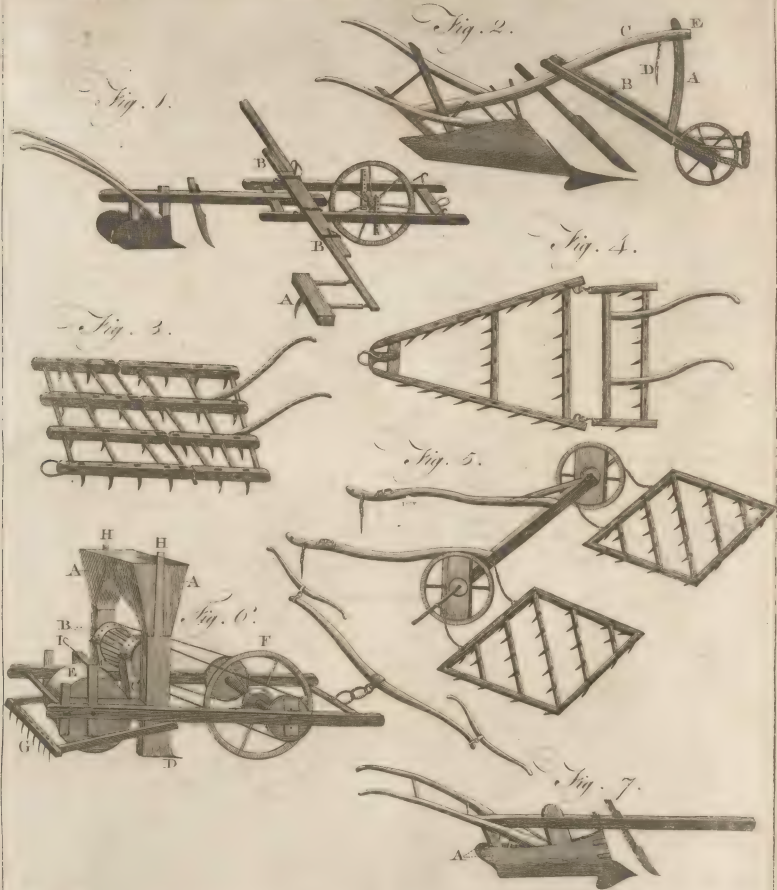
SUMMARY of the OPERATIONS necessary in executing the NEW HUSBANDRY with the PLOUGH.

1. It is indispensible necessary that the farmer be provided with a drill and hoe-plough.
2. The new husbandry may be begun either with the winter or spring corn.
3. The land must be prepared by four good ploughings, given at different times, from the beginning of April to the middle of September.
4. These ploughings must be done in dry weather, to prevent the earth from kneading.
5. The land must be harrowed in the same manner as if it were sowed in the common way.
6. The rows of wheat should be sowed very straight.

7. When

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Summary of
the opera-
tions.

Plate VI.





7. When the field is not very large, a line must be strained across it, by which a rill may be traced with a hoe for the horse that draws the drill to go in; and when the rows are sown, 50 inches must be left betwixt each rill. But, when the field is large, stakes at five feet distance from each other must be placed at the two ends. The workman must then trace a small furrow with a plough that has no mold-board, for the horse to go in that draws the drill, directing himself with his eye by the stakes.

8. The fowing should be finished at the end of September, or beginning of October.

9. The furrows must be traced the long way of the land, that as little ground as possible may be lost in head-lands.

10. The rows, if it can be done, should run down the slope of the land, that the water may get the easier off.

11. The seed-wheat must be plunged into a tub of lime-water, and stirred, that the light corn may come to the surface and be skimmed off.

12. The feed must be next spread on a floor, and frequently stirred, till it is dry enough to run through the valves of the happer of the drill.

13. To prevent smut, the feed may be put into a ley of ashes and lime.

14. After the hoppers of the drill are filled, the horse must go slowly along the furrow that was traced. That a proper quantity of feed may be sown, the aperture of the happer must be suited to the size of the grain.

15. As the drill is seldom well managed at first, the field should be examined after the corn has come up, and the deficiencies be supplied.

16. Stiff lands, that retain the wet, must be stirred or hoed in October. This should be done by opening a furrow in the middle of the intervals, and afterwards filling it up by a furrow drawn on each side, which will raise the earth in the middle of the intervals, and leave two small furrows next the rows, for draining off the water, which is very hurtful to wheat in winter.

17. The next stirring must be given about the end

of March, with a light plough. In this stirring the furrows made to drain the rows must be filled up by earth from the middle of the intervals.

18. Some time in May, the rows must be evened; which, though troublesome at first, soon becomes easy, as the weeds are soon kept under by tillage.

19. In June, just before the wheat is in bloom, another stirring must be given with the plough. A deep furrow must be made in the middle of the intervals, and the earth thrown upon the sides of the rows.

20. When the wheat is ripe, particular care must be taken, in reaping it, to trample as little as possible on the ploughed land.

21. Soon after the wheat is carried off the field, the intervals must be turned up with the plough, to prepare them for the feed. The great furrow in the middle must not only be filled, but the earth raised as much as possible in the middle of the intervals.

22. In September, the land must be again sowed with a drill, as above directed.

23. In October, the stubble must be turned in for forming the new intervals; and the same management must be observed as directed in the first year.

We pretend not to determine whether the old or new husbandry be preferable in every country.

With regard to this point, the climate, the situation of particular land, skill and dexterity in managing the machinery, the comparative expence in raising crops, and many other circumstances, must be accurately attended to before a determination can be given. One observation, however, may be made in favour of the new husbandry:—Though the particular modes of cultivating land by it are perhaps too limited to be universally adopted; yet it has been of great use in raising suspicions concerning the old method, and in turning the views of philosophers and farmers towards improving in general. Many real improvements in agriculture have been the consequences of these suspicions; and as this spirit of inquiry remains in full vigour, particularly in our own country, a solid foundation is laid for expecting still further improvements in this useful art.

A G R

AGRIFOLIUM, or AQUIFOLIUM. See ILEX.
AGRIMONIA, AGRIMONY; a genus of the digynia order, belonging to the dodecandria class of plants. Of this genus there are five species enumerated by botanical writers; but none of them have any remarkable properties except the two following.—(1.) The eupatoriæ, or common agrimony. It grows naturally in several parts of Britain by the sides of hedges and of woods.—This species is eat by sheep and goats, but refused by horses and swine. The Canadians are said to use an infusion of the root in burning fevers, with great success. An infusion of six ounces of the crown of the root in a quart of boiling water, sweetened with honey, and half a pint of it drank three times a-day, is an effectual cure for the jaundice, according to Doctor Hill. He advises to begin with a vomit, afterwards to keep the belly soluble, and to continue the medicine as long as any symptoms of the disease remain.—It is said to be an aperient, detergent, and strengthener of the viscera. Hence it is recommended in scorbutic disorders, in debility and laxity of

A G R

the intestines, &c. Digested in whey, it affords an useful diet-drink for the spring-season, not ungrateful to the palate or stomach. Doctor Alston says, that the best mode of administering this herb is in powder, when the intention is to corroborate; and that if thus taken in a large quantity, we may expect many of the effects of the bark from it in agues.—(2.) The odorata, or sweet-scented agrimony. This grows near four feet high; the leaves have more pinnæ than the former; the serratures of the leaves are also sharper, and, when handled, they emit an agreeable odour. The leaves of this species make an agreeable cooling tea, which is sometimes prescribed by physicians as a drink for people in fevers.

Culture. Both these species may be propagated either by seed, or by parting the roots in autumn when the leaves begin to decay. The seeds ought also to be sown in this season; for if kept out of the ground till spring, they seldom come up that year.—Agrimony is a hardy perennial plant, and will thrive in almost any soil or situation; but the plants should not be placed

Agri-
monoides
||
Agrippa.

nearer one another than two feet, that the roots may have room to spread.

AGRIMONOIDES, the trivial name of a species of the agrimonia.

AGRIMONY. See AGRIMONIA.

Hemp AGRIMONY. See EUPATORIUM.

Water-hemp AGRIMONY. See BIDENT.

AGRIONIA, in Grecian antiquity, festivals annually celebrated, by the Bœotians, in honour of Bacchus. At these festivals, the women pretended to search after Bacchus as a fugitive; and, after some time, gave over their inquiry, saying, that he was fled to the Muses, and was concealed among them.

AGRIOPHAGI, in antiquity, a name given to those who fed on wild beasts. The word is Greek, compounded of *αγρος*, wild, savage, and *φαγε*, I eat. The name is given, by ancient writers, to certain people, real or fabulous, said to have fed altogether on lions and panthers. Pliny and Solinus speak of *Agriophagi* in Ethiopia, and Ptolemy of others in India on this side the Ganges.

AGRIPPA, in midwifery, a term applied to children, brought forth with their feet foremost.

AGRIPPA (Herod) son of Aristobulus by Berenice, and the grandson of Herod the Great. He was cast into prison by Tiberius for wishing Caius emperor, who gave him a chain of gold, equal in weight to those which he had wore in prison, and afterward made him king of Judea. He put St James to death, imprisoned St Peter, and, for allowing the deifying shouts of the people, was eaten up with worms.

AGRIPPA II. son of the preceding Herod, was made king of Chalcide; but three or four years after, he was deprived of that kingdom by Claudius, who gave him in the place of it other provinces. In the war Vespasian carried on against the Jews, Herod sent him a succour of 2000 men; by which it appears, that, tho' a Jew by religion, he was yet entirely devoted to the Romans, whose assistance indeed he wanted, to secure the peace of his own kingdom. He lived to the third year of Trajan, and died at Rome A. C. 100. He was the seventh and last king of the family of Herod the Great. It was before him and Berenice his sister, that St Paul pleaded his cause at Cæsarea.

AGRIPPA (Marcus Vipsanius), son-in-law to Augustus, of mean birth, but one of the most considerable generals among the Romans. Augustus's victory over Pompey and Mark Anthony was owing to his counsel: he adorned the city with the pantheon, baths, aqueducts, &c.

AGRIPPA (Cornelius), born at Cologne in 1486, a man of considerable learning, and by common report a great magician; for the monks at that time suspected every thing of hereby or sorcery which they did not understand. He composed his *Treatise of the Excellence of Women*, to insinuate himself into the favour of Margaret of Austria, governess of the Low-Countries. He accepted of the charge of historiographer to the emperor, which that prince gave him. The treatise of the *Vanity of the Sciences*, which he published in 1530, enraged his enemies extremely; as did that of *Occult Philosophy*, which he printed soon after at Antwerp. He was imprisoned in France for something he had written against Francis I.'s mother; but was enlarged, and went to Grenoble, where he died in 1534. His works are

printed in two volumes octavo.

AGRIPPINA, daughter of Germanicus, sister of Caligula, and mother of Nero; a woman of wit, but excessively lewd: she was thrice married, the last time to Claudius her own uncle, whom she poisoned to make way for Nero her son. Nero afterward caused her to be murdered in her chamber, when he bid the executioner stab her first in the belly, that had brought forth such a monster.

AGRIPPINA COLONIA UBIORUM, (Pliny, Suetonius); now *Cologne*, so called from Agrippina, the daughter of Germanicus, and mother of Nero, who had a colony sent thither at her request by the emperor Claudius, to honour the place of her birth. See *COLOGNE*.

AGRIPPINIANS, in church-history, the followers of Agrippinus bishop of Carthage, in the third century, who first introduced and defended the practice of re-baptization.

AGROM, a disease frequent in Bengal, and other parts of the Indies, wherein the tongue chaps and cleaves in several places, being extremely rough withal, and sometimes covered with white spots. The Indians are very fearful of this disease, which they attribute to extreme heat of the stomach. Their remedy is, to chew the black-feeded basilica, drink some chalybeated liquor, or the juice of large mint.

AGROSTEMMA, *WILD LYCHNIS*, or *CAMPION*; a genus of the pentagynia order, belonging to the decandria class of plants.

Species. The most remarkable are, 1. The githago, hairy wild lychnis, or common campion, which grows naturally in corn-fields in most parts of Britain. The flowers appear in June, are generally purple, sometimes white, and by cultivation yellow. 2. The coronaria, or single rose-campion. Of this species there are four varieties; one with deep red, another with flesh-coloured, a third with white flowers; and a fourth with double flowers, which has turned most of the others out of the gardens. 3. The *flos jovis*, or umbelliferous mountain-campion, grows naturally upon the Helvetic mountains: it is a low plant with woolly leaves; the flower-stem rises near a foot high; the flowers grow in umbels on the top of the stalk, and are of a bright red colour. They appear in July, and the seeds ripen in September.

Culture. The first and third species are annual plants, so must be propagated by seeds; but as the first is found naturally in corn-fields, it is very seldom cultivated in gardens; the third sort should have a shady situation, and thrives best in a strong soil. The second species is perennial, but only those varieties which have single flowers produce any seeds; the double kind, therefore, as it produces no seeds, must be propagated by parting the roots in autumn, after the flowers are past. In doing this, every head which can be slipped off with roots should be parted: these should be planted in a border of fresh undunged earth, at the distance of six inches one from the other, observing to water them gently until they have taken root; after which they will require no more; for much wet is very injurious to them, as is also dung. In this border they may remain till spring, when they should be planted in the borders of the flower-garden, where they will be very ornamental during the time of their flowering, which is in July and August.—This plant is eat by horses,

Agrippina
||
Agrostema.

Agrostis ||
horfes, goats, and sheep.

AGROSTIS, BENT-GRASS, in botany, a genus of the triandria order, belonging to the digynia class of plants. The calix has two valves, terminated by a beard or aun. There are fifteen species; eight of them natives of Britain. See GRASS.

AGROSTOGRAPHIA, signifies the history or description of grasses.

AGROUND, the situation of a ship whose bottom, or any part of it, hangs or refts upon the ground, fo as to render her immovable, till a greater quantity of water floats her off, or till she is drawn out into the stream by the application of mechanical powers.

AGRYPNIA, among physicians, implies an inapetite to sleep; a troublesome symptom of feverish and other disorders.

AGRYPNIA, in the Greek church, implies the vigil of any of the greater festivals.

AGUE, a general name for all periodical fevers, which, according to the different times of the returns of the feverish paroxysm, are denominated tertian, quartan, and quotidian. See MEDICINE, n° 424—426.

AGUE-TREE, a name given to the salisfras, on account of its febrifuge qualities.

AGUEPERSE, a town of France, situated on the Lyonnois, about fifteen miles north of Clermont.

AGUILLANEUF, or AUGUILLANEUF, a form of rejoicing used among the ancient Franks on the first day of the year. The word is compounded of the French *A*, to, *gui* millet, and *l'an neuf* the new year. Its origin is traced from a druid-ceremony: the priests used to go yearly in December, which with them was reputed a sacred month, to gather millet of the oak in great solemnity. The prophets marched in the front, singing hymns in honour of their deities; after them came a herald with a caduceus in his hand; these were followed by three druids a-breast, bearing the things necessary for sacrifice; last of all came the chief, or arch-druid, accompanied with the train of people. The chief druid climbing the oak, cut off the millet with a golden sickle, and the other druids received it in a white cloth; on the first day of the year, it was distributed among the people, after having blessed and consecrated it by crying *Au gui l'an neuf*, to proclaim the new-year. This cry is still continued in Picardy, with the addition of *Plantez, Plantez*, to wish a plentiful year. In Burgundy and some other parts, the children use the same word to beg a new-year's gift. Of later times the name *Auguillaneuf* was also given to a sort of begging, practised in some dioceses, for church-tapers, on new-year's day, by a troop of young people of both sexes, having a chief, &c. It was attended with various ridiculous ceremonies, as dancing in the church, &c. which occasioned the synods to suppress it.

AGUILLAR, a town of Spain, in the province of Navarre, about twenty-four miles west of Estella.

AGUILLAR *Del Campo*, a town of Old Castile, with the title of marquise, about 15 leagues north of the city of Burgos.

AGUILLONIUS (Francis), a Jesuit, born at Brussels: he was rector of the Jesuits college at Antwerp, and eminent for his skill in mathematics. He was the first who introduced that science among the Jesuits in the low countries: he wrote a book of Optics, and was employed in finishing his Catoptrics and Dioptrics,

when death prevented him in 1617.

AGUIRRA (Joseph Sænz de), a Benedictine, and one of the most learned men of the 17th century, was born March 24, 1630. He was censor and secretary of the supreme council of the inquisition in Spain, and interpreter of the scriptures in the university of Salamanca. He printed three volumes in folio upon Philosophy, a Cometary upon Aristotle's ten books of Ethics, and other pieces. He died at Rome, August 19, 1699.

AGUL, in botany, a synonyme of the hedyfarum, See HEDYSARUM.

AGURAH, in Jewish antiquity, the name of a silver coin, otherwise called *gerah* and *kesbita*.

AGURIUM, or AGYRIUM, (anc. geogr.) a town of Sicily in the Val di Demona, near the river Semeus. The people were called *Populus Agrinensis*, by Cicero; *Agrinus*, by Pliny. It was the birth-place of Diodorus Siculus, as he himself testifies; but he calls it *Agrium*, as it is now called *S. Philippo d'Argirone*, which modern name seems to confirm that *Argyrium* is the true reading.

AGUSADURA, in ancient customs, a fee due from vassals to their lord for the sharpening their ploughing tackle. Anciently the tenants in some manors were not allowed to have their rural implements sharpened by any but whom the lord appointed; for which an acknowledgment was to be paid, called *Agusadura*, in some places *Agusage*: which some take to be the same with what was otherwise called *Reillage*, from the ancient French *Reille*, a plough-share.

AGUTI, in zoology, the trivial name of a species of the mouse, belonging to the mammalia gires of Linnæus. See MŪS.

AGUTI-GUEFA, in botany. See SAGITTARIUM.

AGYEI, in antiquity, a kind of obelisks, sacred to Apollo, erected in the vestibles of houses, by way of security.

AGYNIANI, in church-history, a sect who condemned all use of flesh, and marriage, as not instituted by God, but introduced at the instigation of the devil. The word is compounded of the privative *a* and *γυν* woman. They are sometimes also called *Agyennenses*, and *Agyonii*; and are said to have appeared about the year 694. It is no wonder they were of no long continuance. Their tenets coincide in a great measure with those of the Abelians, Gnostics, Cerdonians, and other preachers of chastity and abstinence.

AGYRTÆ, in antiquity, a kind of strolling impostors running about the country, to pick up money by telling fortunes at rich mens doors, pretending to cure diseases by charms, sacrifices, and other religious mysteries; also to expiate the crimes of their deceased ancestors, by virtue of certain odours and fumigations; to torment their enemies, by the use of magical verses and the like. The word is Greek *Αγυρται*, formed of the verb *αγυρ*, I congregate; alluding to the practise of Charleatans, who gather a crowd about them.

AGYRTÆ, among the Greeks, amount to the same with *Eruſcator* among the Latins, and differ not much from gypsies among us.

AHAB, son of Omri king of Israel, succeeded his father A. M. 3086, and surpassed all his predecessors in impiety and wickedness.

Agul
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Ahab.

Ahætulla
||
Ajax.

AHETULA, the trivial name of a species of the coluber. See COLUBER.

AHALOTH. See XYLO-ALOES.

AHEAD, a sea-term, signifying further onward than the ship, or at any distance before her, lying immediately on that point of the compass to which her stem is directed. It is used in opposition to *astern*, which expresses the situation of any object behind the ship. See ASTERN.

AHICCYATLI, in zoology, the Indian name of a serpent resembling the rattle-snake, only it wants the rattles. It is as fatal in the effect of its poison as any known species of serpent.

AHMELLA, in botany. See BIDENS.

AHOUI, in botany, a synonyme, and also the trivial name of a species of the cerbera. See CERBERA.

A-HULL, in the sea-language, the situation of a ship when all her sails are furled on account of the violence of the storm, and when having lashed her helm on the lee-side, she lies nearly with her side to the wind and sea, her head being somewhat inclined to the direction of the wind.

AHUN, a town in France, in the Upper Marche and generality of Moulins, and is a royal jurisdiction. It is seated on the river Creuse, near a Benedictine abbey of the same name, eight miles south-east of Gueret, 30 north-east of Lomages, and 55 south-east of Moulins. E. Long. 2. 8. N. Lat. 49. 5.

AHUYS, a town of Sweden. It is small, but very strong by its situation, and has a good port. It is in the principality of Gothland, in the territory of Blekinge, near the Baltic sea, about 18 miles from Christianstad. E. Long. 14. 10. N. Lat. 56. 20.

AI, (anc. geogr.) a town in Judea, to the north of Jericho, called *Aia* by Josephus, and the inhabitants *Ainats*.

AICUROUS, a species of parrot. See PSITTACUS.

AJALON, (anc. geogr.) a town of the tribe of Dan, one of the Levitical. Another in the tribe of Benjamin, in whose valley Joshua commanded the moon to stand still, being then in her decrease, and consequently to be seen at the same time with the sun.

AJAN, a coast and country of Africa, has the river Quilmanci on the south; the mountains from which that river springs, on the west; Abyssinia, or Ethiopia, and the strait of Babelmandel, on the north; and the eastern, or Indian ocean, on the east. The coast abounds with all necessaries of life, and has plenty of very good horses. The kings of Ajan are often at war with the emperor of the Abyssins; and all the prisoners they take they sell to the merchants of Cambaya, those of Aden, and other Arabs, who come to trade in their harbours, and give them in exchange, coloured cloths, glass-beads, raisins, and dates; for which they also take back, besides slaves, gold and ivory. The whole sea-coast, from Zanguebar to the strait of Babelmandel, is called the coast of Ajan; and a considerable part of it is styled the Desert-coast.

AJAX, the son of Oileus, was one of the principal generals that went to the siege of Troy: he ravished Cassandra the daughter of Priam, even in the temple of Minerva, where she thought to have found sanctuary. It is said, he made a serpent of fifteen feet long so familiar with him, that it eat at his table, and followed him like a dog. The Locrians had

a singular veneration for his memory.

AJAX, the son of Telamon, was, next to Achilles, the most valiant general among the Greeks at the siege of Troy: he commanded the troops of Salamis, and performed many great actions, of which we have an account in the Iliad, in *Didys Cretenfis*, and in the 23^d book of Ovid's *Metamorphoses*. He was so enraged that the arms of Achilles were adjudged to Ulysses, that he immediately became mad. The Greeks paid great honours to him after his death, and erected a magnificent monument to his memory upon the promontory of Rheum.

AJAX, in antiquity, a furious kind of dance, in use among the Grecians; intended to represent the madness of that hero, after his defeat by Ulysses, to whom the Greeks had given the preference in his contest for Achilles's arms. Lucian, in his treatise of Dancing, speaks of dancing the *Ajax*.—There was also an annual feast called *Ajantia*, *Aiantia*, consecrated to that prince, and observed with great solemnity in the island of Salamis, as well as in Attica; where, in memory of the valour of Ajax, a bier was exposed, set out with a complete set of armour.

AJAZZO, a sea-port town of the island of Corsica, in the Mediterranean, with a bishop's see. Long. 26. 35. Lat. 41. 40.

AJAZZO, a sea-port town of Natolia, in the province of Caramania, anciently Silefia, seated on the coast of the Mediterranean, 30 miles north of Antioch, and 50 west of Aleppo, where the city of Ilius anciently stood, and near which Alexander fought his second battle with Darius. Long. 33. 10. Lat. 37. 0.

AICHSTAT, a town of Germany, in Franconia, and capital of a bishoprick of the same name. It is remarkable for a curious piece of workmanship, called the Sun of the Holy Sacrament, which is in the church: it is of massy gold, of great weight, and is enriched with 350 diamonds, 1400 pearls, 250 rubies, and other precious stones. This place is moderately large, and seated in a valley on the river Altmul, 10 miles N. of Newburgh, and 37 S. of Neuremberg. E. Lon. 11. 10. N. Lat. 49. 0. The bishoprick is 45 miles in length, and 17 in breadth; and the bishop is chancellor of the church of Mayence or Mentz.

AID, in a general sense, denotes any kind of assistance given by one person to another.

AID, in law, denotes a petition made in court to call in help from another person who has interest in land, or any other thing contested.

AID-de-camp, in military affairs, an officer employed to receive and carry the orders of a general.

AID, *Auxilium*, in ancient customs, a subsidy paid by vassals to their lord on certain occasions. Such were the aid of relief, paid upon the death of the Lord Mesne to his heir; the *aid cheval*, or capital aid, due to the chief lord on several occasions, as, to make his eldest son a knight, to make up a portion for marrying his daughter, &c.

AIDS, in the French customs, certain duties paid on all goods exported or imported into that kingdom.

Court of Aids, in France, a sovereign court established in several cities, which has cognizance of all causes relating to the taxes, gabelles, and aids, imposed on several sorts of commodities, especially wine.

AIDS, in the menage, are the same with what some writers

Ajax
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Aids.

Aidan
||
Ailebury.

writers call *cherishings*, and used to avoid the necessity of corrections.—The inner heel, inner leg, inner rein, &c. are called *inner aids*; as the outer heel, outer leg, outer rein, &c. are called *outer aids*.

AIDAN, a famous Scottish bishop of Lindisfarne, or Holy Island, in the 7th century, was employed by Oswald king of Northumberland in the conversion of the English, in which he was very successful. He died in 651.

AIGHENDALE, the name of a liquid measure used in Lancashire, containing seven quarts.

AIGLE, a bailiwick, in the territory of Romand, in Switzerland, consists of mountains and valleys, the principal of which are the Aigle and Bex. Through these is the great road from Vallais into Italy. When you pass by Villeneuve, which is at the head of the lake of Geneva, you enter into a deep valley three miles wide, bordered on one side with the Alps of Switzerland, and on the other with those of Savoy, and crossed by the river Rhone. Six miles from thence you meet with Aigle, a large town, seated in a wide part of the valley, where there are vineyards, fields, and meadows. The governor's castle is on an eminence that overlooks the town, and has a lofty marble tower. This government has nine large parishes; and is divided into four parts, Aigle, Bex, Olon, and Ormont. This last is among the mountains, and joins to Rougement. It is a double valley, abounding in pasture-lands. Ivorna, in the district of Aigle, was in part buried by the fall of a mountain, occasioned by an earthquake in 1584.

AIGLE a small town, in France, in Upper Normandy, twenty-three miles from D'Evereux, and thirty-eight from Rouen. It is surrounded with walls and ditches, has six gates, three suburbs, and three parishes. It trades in corn, toys, and more particularly in needles and pins. E. Long. 1. 5. N. Lat. 48. 35.

AIQUILLON, a small town of France in the province of Guienne, situated at the conflux of the rivers Garonne and Lot.

AIGUISCE, in heraldry, denotes a cross with its four ends sharpened, but so as to terminate in obtuse angles.—In differs from the cross fitchee, in as much as the latter tapers by degrees to a point, and the former only at the ends.

AILANA, AILATH, or AHELOTH, anciently a town of Arabia Petrea, situated near the Sinus Elanites of the Red Sea. It was also called *Blath*, and *Eloth*, (Stephanus, Strabo, Moses.) The same with *Elena*.

AILE, in law, a writ which lies where a person's grandfather, or great-grandfather, being seized of lands, &c. in fee-simple, the day that he died, and a stranger abates or enters the same day, and dispossesses the heir of his inheritance.

AILESBUURY, AYLESBUURY, or ALESBUURY, a borough town in Buckinghamshire, consisting of about 400 houses. It consists of several streets, though the houses are not very contiguous: these lie round about the market place, in the middle of which is a convenient hall, where the sessions are held, and sometimes the assizes for the county. It sends two members to parliament; has a market on Saturdays; and three fairs for cattle, viz. on the Saturday before Palm-funday, June 14th, and September 25th. It is sixty miles south-east of Bucingham and forty-four north-west

of London. W. Long. o. 40. N. Eat. 51. 40.

AILRED, or EALRED, abbot of Revely in Lincolnshire, in the reigns of Stephen and Henry II. He was born in 1109, of a noble family, and educated in Scotland with Henry the son of king David. On his return to England, he became a monk of the Cistercian order, in the monastery of Revely, of which he afterwards was made abbot. He died on the 12th of January, 1166, aged 57, and was buried in his monastery. "He was (says Leland) in great esteem during his life; celebrated for the miracles wrought after his death; and admitted into the catalogue of saints." He was author of several works; most of which were published by Gilbo the Jesuit at Douay, 1631; part of them may be also found in the *Bibliotheca Cisterciensis*, and *Bibliotheca Patrum*. His principal work is the *Speculum charitatis*. Leland, Bale, and Pits, mention several manuscripts which never were published.

AINSWORTH (Dr Henry), an eminent nonconformist divine, who, about the year 1590, distinguished himself among the Brownists; which drew upon him such troubles, that he was obliged to retire to Holland, and became minister of a church at Amsterdam. His skill in the Hebrew language, and his excellent Annotations on the Holy Scriptures, which are still highly esteemed, gained him great reputation. He also wrote several pieces in defence of the Brownists, and several other works.

AINSWORTH (Robert), born at Woodyale in Lancashire in 1660, was master of a boarding-school at Bethnal-green, from whence he removed to Hackney, and to other places in the neighbourhood of London. After acquiring a moderate fortune, he retired, and lived privately till the time of his death, which happened in 1743. We are indebted to him for the best Latin and English Dictionary extant: he published it in quarto 1736; and in 1752, the fourth edition, under the care of Doctor Ward of Graham College, and the Rev. William Younge, was enlarged to two vols folio.

AIR is that invisible fluid which every where surrounds the globe; and on which depends the life not only of every kind of animals, but of vegetables also; and which seems, in short, to be one of the great agents employed by nature in carrying on her operations throughout the whole world.

For many ages the air was considered as an absolutely simple fluid, the component parts of which were beyond the reach of man's wisdom to discover. Its common operations were thought to be performed, either by its heat or cold, its moisture or dryness; and if any effects were discovered which could not be explained by these, (such as the appearance of pestilential diseases), they were reckoned to be entirely supernatural, and the immediate effect of Divine power.

In the beginning of the last century, Lord Bacon and Galileo discovered some of what may be called the *mechanical powers* of the air. The former, from experiments, ascertained its elasticity; and the latter, its weight. The pressure of the atmosphere, however, was more fully discovered by Toricelli, the disciple of Galileo, and inventor of the barometer, as Lord Bacon had been of the thermometer. Pascal observed, that this pressure was not always the same; but diminished according to the height to which the barometer was carried. Otto de Guericke soon after invented the air-pump.

Allied
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Air.

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Definition.

3
Ancient notions concerning it.

3
Discovery of its mechanical powers.

Air.

pump; which was much improved by Mr Boyle and Doctor Hooch, two members of the Royal Society. The complete knowledge of the mechanical properties of the air, however, must be ascribed to the labours of Doctor Halley and Sir Isaac Newton; who have, by mathematical demonstration, established its rarefaction, and the proportion in which it is rarefied, according to its distance from the earth, &c.

While these discoveries were making concerning the mechanical properties of the air, little notice seems to have been taken of the different kinds of fluid which go under that name. It was known, indeed, that air was separable from terrestrial bodies by means of fire, fermentation, &c.; but this was commonly reckoned to be the flame with the air we breathe. Van Helmont, a disciple of Paracelsus, was the first who undertook to make inquiries concerning this species of air. He gave it the name of *gas sylvestre*, from the Dutch word *ghaas*, signifying spirit; and observes, that some bodies resolve themselves almost entirely into it. "Not," (says he), that it had been actually contained in that form in the bodies from which it was separated; but it was contained under a concrete form, as if fixed, or coagulated." According to this author, the gas sylvestre is the same with what is separated from all substances by fermentation; from vegetables by the action of fire; from gun-powder when it explodes; and from charcoal when burning. On this occasion he asserts, that sixty-two pounds of charcoal contain sixty-one pounds of gas, and only one pound of earth. To the effluvia of gas, he also attributes the fatal effects of the grotto del Cani in Italy, and the suffocation of workmen in mines. He asserts, that it is to the corruption of the aliment, and the gas discharged from it, that we are to attribute wind, and the discharges of it from the bowels. Upon the same principles he accounts for the swelling of dead bodies, which have remained some time under water; and for the tumours which arise on some parts of the body in certain diseases. He also determines, that this gas is different from the air we breathe; that it has a greater affinity with water: and he imagined it might consist of water reduced to vapours, or a very subtil acid combined with volatile alkali.

Mr Boyle repeated all Van Helmont's experiments to more advantage than he himself had performed them; but seems not to have proceeded further in his discoveries than Van Helmont did: only he found, that there are some bodies, such as sulphur, amber, camphor, &c. which diminish the volume of air in which they burn.

Doctor Hales was the first person who attempted to determine the quantity of air produced from different bodies: and, for this purpose, he made experiments on almost every known substance in nature, examining them by distillation, fermentation, combustion, combinations, &c. Of the vegetable substances which he examined, crude tartar seems to have yielded the greatest quantity of air, and essential oils the least. From a cubic-inch of the former he obtained 504 cubic-inches of air; and from a like quantity of oil of aniseeds, only 22. Of the animal-substances, the greatest quantity of air was obtained from the human calculus, or stone extracted from the bladder: three quarters of a cubic-inch of this substance yielding, on distillation, no

less than 516 cubic-inches of air; while a cubic-inch of tallow yielded only 18 inches. In the mineral kingdom, pit-coal gave out the greatest quantity of this fluid, 360 inches of air being obtained from one inch of it, or nearly one-third of its whole weight. From the same quantity of antimony, only 28 inches were obtained. By fermentation, 639 cubic inches of air were obtained from 42 inches of small-beer in seven days; and from 26 inches of bruised apples, 968 inches of air were obtained in thirteen days.

In examining the quantities of air produced from combinations of different bodies, very strange phenomena appeared; the very combinations which produced air one day, would absorb all they had produced, and sometimes much more, the next. Half a cubic inch of sal-ammoniac, with one cubic-inch of oil of vitriol, produced five or six cubic inches of air the first day; and the next, absorbed 15. In a few hours, six inches of oyster-shells, and as much vinegar, produced 29 inches of air; but, in nine days, 21 inches were absorbed, and the remainder disappeared upon pouring water into the vessel. A quarter of an inch of iron-filings, and one cubic inch of sulphur, instead of producing, absorbed 19 inches of air. A cubic inch of aquafortis, with an equal quantity of marcasite, absorbed 85 inches; but the same quantity of aquafortis and sea-coal, absorbed 18 inches in three days; after which, instead of absorbing, they generated 12 inches. Two cubic inches of lime, with four of vinegar, absorbed 22 inches of air: but two inches of lime, with an equal quantity of sal-ammoniac, absorbed 115 inches.

By examining flaming substances, it appeared that all of them, nitre alone excepted, absorbed or consumed air. A lighted candle, three-fifths of an English inch in diameter, consumed 78 inches of air: linen-rags, dipped in melted brimstone, and burnt in a large vessel, consumed 198 inches; in a smaller one, 150. Two grains of Kunkel's phosphorus absorbed 28 inches of air; after which it had only lost half a grain in weight, and in a short time gained a whole grain. A rat, confined in a large receiver, consumed 78 inches before it died; and 73 inches of air breathed by a man till he was almost suffocated, were reduced to 20.

Doctor Hales also first suspected, that the briskness and sparkling of the waters, improperly called *acidulous*, were owing to the air they contained. But notwithstanding all his discoveries concerning the quantity of elastic fluid obtained from different bodies, he did not imagine there was any essential difference between this fluid and the air we breathe, only that it was loaded with noxious vapours, foreign to its nature. He therefore endeavoured to restore air which had been depraved by the respiration of animals, or by burning bodies, to its original purity. This he attempted, by filtering it through flannel which had been steeped in a solution of salt of tartar; and by this means the air was perfectly restored. A candle, likewise placed under a receiver, lined with flannel dipped in a solution of this salt, burned considerably longer than it would otherwise have done. The flannels, however, through which the air was filtered, were sensibly increased in weight.

What doctor Hales only suspected, concerning the impregnation of some kinds of waters with air, was confirmed by M. Vanel, professor of chemistry at Montpellier,

Air.

Production
and absorp-
tion of air.

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Van Hel-
mont the
first disco-
verer of dif-
ferent kinds
of air.

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Discove-
ries by Mr
Boyle.

6
By Dr Hales.

8
Suspicion of
air in mine-
ral waters.

9
Confirmed
by M. Vanel.

Air.

pelier, in a memoir read before the Royal Academy of Sciences in 1750. This gentleman proceeded so far as to disengage the air from the Seltzer waters, and to measure its quantity; which he constantly found to amount to about one-fifth of its bulk. When the water was deprived of this air, it became flat, and ceased to sparkle; the only difference then between the Seltzer water, deprived of its air, and common water, was, that the former contained a small quantity of sea-salt. Upon these principles he attempted to recompose Seltzer water, by dissolving in a pint of common water two drachms of fossil alkali, and then adding an equal quantity of marine acid. The quantity of sea-salt produced by the union of these two, he knew would prove equal to that contained in a pint of Seltzer water; and the effervescence produced by the action of the acid and alkali upon each other, he imagined, would produce air sufficient for the impregnation of the water. In this he was not deceived; the water thus produced was not only analogous to Seltzer, but much more strongly impregnated with air.

10
Discoveries
by Dr Black.

Dr Black professor of chemistry at Glasgow, now at Edinburgh, first discovered, that magnesia alba, chalk, and all the earths in general which are reduced to quicklime by calcination, consist of an alkaline earth, by itself soluble in water, but which, combined with a large quantity of fixed air, becomes insoluble; losing the properties of quicklime, and assuming the natural appearance we observe those earths to have when not reduced into lime. The same thing he discovered in alkalies, both fixed and volatile. On the fixed air contained in these bodies, he found their property of effervescing with acids to depend, as likewise their mildness; both the alkalies and calcareous earth being highly caustic when deprived of their fixed air. He also found, that this fluid which he called *fixed-air*, had different degrees of affinity with different substances; that it was stronger with calcareous earth, than with fixed alkali; with fixed alkali, than magnesia; and with magnesia, than volatile alkali. He also suspected, that the fixed air of alkaline salts unites itself with the precipitates of metals, when thrown down from acids; and that the increase of weight observable in these precipitates, was owing to this cause. But he was of opinion, that the fluid which he called *fixed air* was very different from the common air we breathe; and therefore adopted the name of air, merely as one already established, whatever impropriety there might be in the term.

11
By the Count de
Saluces.

In the mean time, the count de Saluces, at Turin, was employing himself in making experiments on the elastic fluid discharged from gun-powder.—He found, that, when at liberty, this species of air occupied two hundred times the space of that taken up by the gun-powder itself. He was able to reduce it to the same state with common air, by filtering through alkaline solutions, or by exposing it for twelve hours to the degree of cold in which water freezes. The air detached from pulvis fulminans he found to be much less in quantity than that from gun-powder, notwithstanding the explosion of the former is much greater. He also observed, that air disengaged from effervescing bodies extinguishes flame; but that what was separated from volatile alkali and vinegar, was an exception to this rule. He was, however, of opinion, that all these

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different fluids were only common air loaded with heterogeneous particles.

Mr Haller first inferred, from Doctor Hales's experiments, that air is the real cement of bodies; which, fixing itself in the solids and fluids, unites them to each other, and serves as a bond by which they are kept from dissolution. In 1764, Dr Macbride of Dublin published a number of experiments in support of this doctrine. From his work it appears, that fixed air is separated, not only from all substances in fermentation, but also from all animal substances as they begin to putrefy; and that this air is capable of uniting itself to all calcareous earths, as well as alkalies both fixed and volatile, and restoring to them the property of effervescing with acids when they have by any means been deprived of it.—The conclusions drawn by him from his numerous experiments were, that fixed air is an elastic fluid, very different from the common air we breathe: that it is possessed of a strong antiseptic quality, and may be introduced with safety into the intestinal canal, and other parts of the animal economy, where common air would have fatal effects; but is mortal if breathed into the lungs, &c.

In 1766 and 1767, Mr Cavendish communicated some new experiments to the Royal Society at London, wherein he determines the quantity of air contained in fixed alkali, when fully saturated with it, to be five-twelfths of its weight, and seven-twelfths in volatile alkali: that water is capable of absorbing more than its own bulk of this air; that it has then an agreeable, spirituous, and acidulous taste; and that it has the property of dissolving calcareous earths and magnesia, as well as almost all the metals, especially iron and zinc: that the vapour of burning charcoal occasions a remarkable diminution of common air, at the same time that a considerable quantity of fixed air is produced in the operation. He also found, that solution of copper in spirit of salt, instead of producing inflammable air, like that of iron or zinc, afforded a species of air which lost its elasticity as soon as it came into contact with water.

About the same time that Dr Macbride published his experiments, a treatise appeared, written in German by Mr Meyer, apothecary at Onabruck, wherein he opposes Doctor Black's theory concerning fixed air being the cause of effervescence in calcareous earths and alkaline salts. The loss of weight these substances suffer by calcination, he attributes to the quantity of water expelled by the vehement heat; and their not effervescing afterwards, he attributes to their having been neutralized, while in the fire, by a peculiar kind of acid, which he calls *acidum pingue*. The existence of such an acid in lime he proves from the precipitation of lime-water by alkaline solutions. From this he concludes, that the acidum pingue forsakes the earth, which it before kept in a dissolved state, to unite with the alkali. This acid he also affirms to be what escapes from charcoal in burning; what unites with metals in their calcination; and what gives the causticity to volatile and fixed alkalies, as being the very acid, *caustic*, or power of fire itself.

A strong objection lies against this theory, from a fact discovered by Doctor Black; namely, that pure calcareous earth dissolved in the nitrous acid, may be precipitated either in the form of lime, or of chalk, according as we make use of the caustic or the mild alkalies.

Z

lies.

Air.

12
By Mr Haller.

13
By Dr Macbride.

14
His opinion concerning fixed air.

15
Quantity of fixed air contained in alkaline salts determined by Mr Cavendish.

16
Dr Black's theory opposed by Mr Meyer.

17
His manner of evading Dr Black's objections.

Air. lies. The reason given by Dr Black for this phenomenon is, that, in the dissolution of the earth by the acid, all its fixed air is expelled. In the precipitation, if a mild fixed alkali is made use of, the fixed air is expelled from it by its union with the acid, and the calcareous earth has liberty again to combine with the fixed air expelled from the alkali; in which case, the earth appears in its natural mild state: but if an alkali is made use of, which contains no fixed air, the calcareous earth has none to combine with, and therefore appears in the state of lime.

This formidable objection Mr Meyer easily solves by his new hypothesis of the acidum pingue. "When we mix (says he) a solution of calcareous earth in the nitrous acid with a caustic fixed alkali in a fluid state, we mix solutions of two neutral salts together; the one of calcareous nitre, the other of alkali saturated with acidum pingue. In this case, according to the known laws of affinities, a double decomposition ought to take place; and we see it actually does so. The weaker acidum pingue is expelled from its basis by the nitrous acid, which forsakes the earth to unite with the alkali. The acidum pingue, having now nothing else to combine with, unites with the earth which the nitrous acid hath left, neutralizes, and forms it into lime. The case is different when the mild alkali is employed: for this having no acidum pingue joined with it, can communicate none; and therefore the precipitate falls as a calcareous earth."

18
Answered
by Mr Jac-
quin.

To this new system of Mr Meyer's, Mr Jacquin, botanical professor at Vienna, published an answer in 1769.—He first attempts to prove, that calcareous earth is not converted into quicklime merely by the loss of its humidity. To ascertain this, he distilled 38 ounces of limestone in a stone-retort, fitted with a large tubulated receiver, with a fire gradually increased to the highest degree; and obtained only two ounces of water, which had some slight traces of volatile alkali. This came over with a moderate fire; and after the aqueous vapours ceased, an elastic vapour began to separate very plentifully, and continued for an hour and an half to fly off through the tube of the receiver with an hissing noise. The lime which was left in the retort weighed only 17 ounces.—Here was therefore a deficiency of 19 ounces, which Mr Jacquin attributed to the air; and, according to him, limestone contains six or seven hundred times its bulk of air.

Mr Jacquin afterwards examines the action of water upon lime; and finds, that it is by no means the absence or presence of moisture in any degree, which constitutes lime; seeing it can be preserved under water for any length of time as lime, provided we keep the surface of the water from contact with the air.

19
Mr Crans's
reply.

About the time that Mr Jacquin's performance made its appearance, Mr Meyer died; but Mr Crans, physician to his Prussian majesty, published a reply to Mr Jacquin at Leipzig. He eludes the force of Mr Jacquin's experiment with limestone distilled in a retort, by attributing to water, reduced to a state of vapour, or in a great degree of expansion, the elastic separation during the continuance of the distillation. But of this assertion he hath not brought any decisive proof.

Mr Crans denies that lime is deprived of the power of effervescing with acids; and corroborates his assertion, both from experiments made by himself, and

by the united testimonies of Messrs Duhamel, Geoffroy, Homberg, and Pott.—On this occasion he objects, that if lime differs from calcareous earth only in being deprived of its air, it ought, by a short exposure to the open air, to imbibe all that it has lost; but so far from this, he affirms, that, after being exposed a considerable time, it even acquires greater causticity. In favour of Mr Meyer's hypothesis, he likewise observes, that the sudden swelling and heat, observed in the slaking of lime, is a natural consequence of his system, whereas it is absolutely inexplicable on Dr Black's hypothesis; which also can give no reason why calcareous earth dissolves with very little heat in the nitrous acid, while the dissolution of lime in the same acid produces a degree of heat superior to that of boiling water; and asserts the partisans of fixed air to be utterly unable to explain many phenomena, which upon Mr Meyer's plan are perfectly intelligible.

This author further observes, that lime-water dissolves sulphur, camphor, and resins, nearly in the same manner that spirit of wine does. If Dr Black's disciples then reason consistently, they ought to say that it renders those substances soluble by attracting their air from them; but thus they will be obliged to affirm the same of spirit of wine, which, he says, would lead them into a labyrinth of difficulties, if not of absurdities.

With regard to effervescence, Mr Crans observes, that, in the dissolution of a calcareous earth, we may have an effervescence or not, just as we please, by employing a strong or a weak acid; whereas, on Dr Black's plan, there ought to be an effervescence whether the acid employed is strong or weak.—He afterwards shews, that a brisk effervescence may be obtained by a mixture of caustic lixivium with an acid, though, according to Dr Black and Mr Jacquin, neither of these substances contain any air. Mr Crans's method is to pour some caustic lixivium into a solution of calcareous earth. The alkali trickles down the sides of the bottle, and reaches the bottom. If the two liquors are afterwards suddenly agitated, a brisk effervescence ensues, and the precipitation is formed in an instant.

The experiments adduced by Dr Black and Mr Jacquin for the support of their system, from the precipitation of calcareous earths in the form of lime by caustic alkalies, are absolutely denied by Mr Crans; who affirms, that, with whatever alkali he precipitated the earth, the precipitate always effervesced with acids. The only difference he could perceive, was, that it had some degree of solubility in water, and turned syrup of violets green.

A strong argument in Dr Black's favour is, that calcareous earths, when dissolved in acids, suffer a loss of weight equal to what they would have done, had they been reduced by calcination into quicklime.—Here Mr Crans opposes experiments made by solutions of calcareous stones in the nitrous acid, compared with solutions of lime. In these processes, he always observed a considerable diminution of weight, but without any rule; sometimes the lime appeared more diminished than the calcareous earth, at other times the calcareous earth appeared to receive an augmentation in weight during its dissolution. These experiments, however, do not appear to have been made with sufficient accuracy, both as Mr Crans employed too shallow vessels, and likewise operated upon such small quantities, that

20
His answer
to Dr Black's
experiments

Air.

an error in the scales might occasion most of the inequalities he has remarked.

21
His answer
to Dr Mac-
bride.

Lastly, Mr Crans proceeds to Dr M^rBride's experiments concerning the restoration of the effervescing power to alkalies by means of fixed air. To this trial he submitted the caustic lixivium made after Mr Meyer's method. The air detached from an effervescing mixture precipitated from the lixivium a white sediment, which collected at the bottom of the bottle. The liquor also acquired, after some time, the property of effervescing with acids; but he observed, that it did so, nearly, in as short a time when exposed to the open air. He also remarked, that this property was much sooner recovered if the lixivium was placed over a moderate fire; and that it was recovered at the instant when the fumes began to arise. Hence Mr Crans concludes, that it acquires the effervescing power only in proportion to the evaporation of the caustic principle, or acidum pingue, to which the alkali was united.

The same thing was observed with respect to the caustic volatile alkali obtained from sal ammoniac. Mr Crans placed one portion of it in a stove; another on hot cinders; and exposed the third to the vapours of an effervescing mixture. At the end of eight hours all the three effervescd. The reason he gives, is, the evaporation of the acidum pingue; so that, according to him, the fixed air had no other effect than what might have naturally taken place in the open air.

Upon the whole, Mr Crans agrees that fixed air combines with alkaline liquors; but he affirms that these liquors are impregnated in the same manner with common water, and denies that there is any real combination, or that to such a combination is owing the mild state of alkaline salts. This he constantly ascribes to the evaporation of the acidum pingue.

22
Dr Black's
theory at-
tacked by
Mr de
Smeth.

While Mr de Crans thus attacked Dr Black's doctrine at Leipzig, Mr de Smeth did the same at Utrecht. This gentleman begins with asserting that we have no knowledge of common air, except by some of its physical effects; of its internal nature and composition we know nothing; and therefore we ought not to call any substance *air*, merely because it has elasticity, and gravity, while it wants the other essential properties of air. He affirms, that elasticity is a very equivocal characteristic of air; and that we may at this rate affirm water reduced into vapours to be atmospherical fluid. He is of opinion, that the elastic vapours which arise either from fermenting or effervescing liquors, are very different from atmospherical air; and he particularly observes, that the vapour of fermentation is much more subtle than common air, as passing through bodies which would be an unsurmountable obstacle to the latter. This vapour he found incapable of being retained by lutes; a moistened bladder, tied over the mouth of the vessel, was not at all inflated, though he was certain, from other experiments, that a great quantity of this vapour had escaped. Nay, so far is he from thinking it a particular element, or *simple*, in the sense which chemists give to that word, that he is very positive it did not originally exist in the bodies from which it is extracted by art, but is only a *miasma* formed by the collision of solid and fluid parts; that it is therefore never produced, but in cases where the bodies suffer violent intestine motion, in consequence of which their parts are altered, broken, and attenuated,

so as to exhibit the phenomena of fixed air.

Air.

The antiseptic virtue of altringents, according to Dr M^rbride, consists in the power they have of contracting the pores of animal substances, and thus preventing the escape of their fixed air. This argument Mr de Smeth pays no regard to; and affirms that we know too little of the manner in which altringents act, to be able to form the least induction from thence. Indeed, from the following experiments mentioned by Mr Henry, F. R. S. it would seem that the sweetening properties of fixed air may possibly depend on an affinity between this fluid and the septic particles arising from putrid bodies.—“A piece of putrid beef, fastened by a string to a cork, was confined in three pints of fixed air for 13 hours, during which time it was considerably, though not entirely, sweetened; but the air in the bottle seemed to have acquired all the putrid smell of which the flesh had been deprived; so that the septic effluvium did not seem to be destroyed, but only to change its place. Slips of linen cloth also, dipped in very rancid oil, were much sweetened by being exposed to a stream of fixed air from an effervescing mixture; but a pint-bottle of the same oil, though it absorbed much of this air, so as to become entirely saturated with it, was not sweetened in the least.”

23
Mr Henry's
experiments
concerning
the antiseptic
power of
fixed air.

Mr de Smeth endeavours to overthrow Dr Black's theory by a number of experiments, most of which are evidently inconclusive. The principal, indeed the only one, which deserves attention, is the following:—Having observed that Homburg's pyrophorus gained weight considerably by being exposed to the air, he was induced to make the same experiment with regard to quicklime. Twelve ounces of this substance, being exposed to the air in a balance, augmented almost visibly in weight during the first month. After this period, its attractive power diminished considerably; and at the end of a year, or thirteen months, was absolutely lost. In this time it had acquired an augmentation in weight of four ounces, three drachms, and forty grains; was reduced to a fine powder, and no longer separated the volatile alkali but in a concrete form. After a space of thirteen months, then, the whole weight of this lime was sixteen ounces, three drachms, and forty grains. Mr de Smeth weighed, separately, twelve ounces, three drachms, and forty grains; which, by calculation, he found ought to contain three ounces, two drachms, fifty-four grains and an half, of matter attracted from the atmosphere. This matter he thought would be easily dissolvable by fire; and to ascertain himself of this, he put the abovementioned quantity into an earthen retort, and exposed it to a very strong fire for two hours. During the operation, there passed into the receiver, one ounce, four drachms, and forty grains of pure phlegm, in which no saline matter could be discovered. Therewithal, weighing ten ounces five drachms, proved a quicklime, notwithstanding there was only two drachms of weight lost upon the whole. If there had been a separation of air then, during the operation, it could by no means have been so considerable, as according to Dr Black's theory it ought to have been.—From this experiment it also appears, that quicklime, by being exposed to the air, gains something from it which cannot afterwards be separated by fire. He afterwards repeated the same operation in open vessels, with the same success. Having put the

24
A remark-
able experi-
ment by Mr
de Smeth.

Air.

Air.

remaining four ounces of lime in a wind furnace, and urged it with a very strong fire, it retained one drachm eleven grains of matter, attracted from the atmosphere. Being again exposed to the air, it regained in weight, 4 drachms, 28 grains. The same thing has been observed by Mr du Hamel; who relates, that lime, flaked in the air, retained an increase of weight, amounting to about four and a half drachms *per pound*, and which could not be driven off by the strongest fire he could employ.

During this controversy among the learned, concerning the existence or non-existence of fixed air, as such, in terrestrial bodies, none of the contending parties seem to have apprehended, that this fluid might possibly be one of the component parts of our atmosphere; and, tho' pernicious when separated from the others, might nevertheless be absolutely necessary, in a certain degree, to preserve that life which its suffocating properties, when collected by itself, would seem calculated rather than to destroy.—To decompose the subtle invisible fluid we daily breathe; to be able to recompose it again, and produce air either salutary or noxious as we please; seems to be one of the highest discoveries ever made by man.—This, however, hath been accomplished by Dr Priestley, whose discoveries we now begin to relate.

25
Dr Priestley first discovered the true composition of the atmosphere.

The Doctor began his experiments much about the same time with Mr de Smeth. He begins with observing, that the term *fixed air* may be equally applied to every species of air hitherto discovered; being inflammable, and other kinds of air, are fixed in terrestrial bodies as well as this. As the term, however, has come into such general use, he chuses to retain it, and distinguishes by that name the fluid which issues from fermenting liquors, and from the effervescence of acids with calcareous earths. It may be obtained in its greatest purity from a mixture of oil of vitriol and chalk. From fermenting liquors also, if the quantity is considerable, it may be obtained tolerably pure; and in this way Dr Priestley himself used frequently to procure it, when living in the neighbourhood of a large brewery.

26
His account of fixed air.

One general property of this air is to be imbibed by water with great avidity. By agitation, the water may be impregnated very quickly with a great quantity of it; but as agitation will also make water part with its fixed air, so great a quantity cannot be imbibed by this means as when the water is left to take up the air leisurely by being at rest.—The air thus taken up is discharged by boiling, or by freezing, the water which contains it.

Dr Priestley agrees with Dr Black, that the concrete form of volatile alkaline salts, as well as the effervescing power of both kinds of alkalies, and calcareous earths, depends upon the presence of fixed air. He also owns it to be of an acid nature, though weak, and of a peculiar kind. This was demonstrated by Mr Bewley, in some letters to Dr Priestley, wherein he gives an account of his having both changed the blue juices of vegetables red with this acid, and likewise formed perfectly neutral salts, both from fixed and volatile alkali, by means of it; and in the last volume of his observations, Doctor Priestley hath given very strong reasons for thinking that fixed air is a modification of the nitrous acid. He found also, that it possessed an iacribating quality; and, when combined with fixed alkali in such quantity as to neutralize it, could not be

27
Fixed air a modification of the nitrous acid.

expelled by a boiling heat, unless the liquor was exposed to the open air; in which case it was impossible to retain it. The Doctor hath also observed, that water held long in fixed air discharged from fermenting liquors, acquires a very disagreeable taste: once he observed it like tar-water; but could not satisfy himself whence this arose, for fear of hurting the liquor; having once injured a large quantity of beer, by holding over it a quantity of ether in a glass.

By agitating pure fixed air in a glass, with water, a part of it always remained, which the water could not imbibe; and in this residuum the Doctor found that animals could live, though flame was extinguished. By a mixture of iron-filings and brimstone, about one fifth of the air was imbibed, and the remainder was not so noxious as before.

In making experiments on common air made noxious by the burning of candles, brimstone, &c. he found, that lime-water became turbid by being placed in the vessel where the candle was burning. This made him suspect, that the manner in which this change happens to the air, is by its depositing its heaviest part, or that which commonly goes by the name of *fixed air*. This he was afterwards assured of, by finding air considerably diminished by the electric spark; and that, in consequence of this, blue juices of vegetables were turned red, and lime-water was precipitated exactly as by fixed air.—The Count de Saluces, at Turin, had imagined, that air which had been rendered incapable of supporting flame, could be restored merely by being exposed to a considerable degree of cold, and also by being compressed in bladders. Dr Priestley repeated his experiments; but found them not to succeed, unless the air was compressed in bladders only, which he attributes to the porosity of the bladders; and with great reason, having constantly found, that however he compressed it, or to whatever degree of cold he exposed it, in glass-vessels, the air underwent no change. Vegetation alone he found effectual for this purpose; which was generally accomplished in five or six days: after which time candles would burn in it perfectly well; while another portion of the same air, after being kept for many months, without any vegetation, would extinguish candles equally as at first.

28
Mistake of the Count de Saluces detected.

29
Noxious air rendered wholesome by vegetation.

The restoration of the air depended entirely upon the vegetation of the plant made use of; for a great number of fresh leaves of mint were unsuccessfully used for a long time, in endeavouring to restore a small quantity of air in which candles had burnt out. Though mint was the first plant made use of by the doctor in this experiment, he found all others to answer equally well, as well aromatics, as those which had no smell; and even poisonous plants, as well as others. The plant he found most efficacious for this purpose was spinach.

One caution the doctor gives in making experiments of this kind, *viz.* that it is absolutely necessary to remove all the dead or rotten leaves of the plant; for they will deprave air in such a manner as to render it incapable of supporting flame. A fresh cabbage-leaf, put under a glass vessel for one night, so affected the air in it, that it extinguished a candle next morning; and this without any appearance of putrefaction in the leaf.

After candles cease to burn, animals feel little or no inconvenience

³⁰ Putrid air favourable to vegetation.
inconvenience from breathing the same air. It is impossible, however, for them to breathe air of this or any other kind for any length of time without suffocation. The reason of their death, according to Dr Priestley, is not the want of the *pabulum vite*, supposed to be contained in the air; but the air being impregnated with something stimulating to the lungs. The noxious effluvia with which the air, in this case, is loaded, cannot be absorbed by standing, without agitation, in fresh or salt water. Growing vegetables, however, restored air depraved by animal respiration, as perfectly as that in which candles had burned out. The same effect was produced by agitating this air with water; and in some degree, also, by a mixture of fixed air.

³⁰ Putrid air favourable to vegetation.

³¹ In inflammable air.

Notwithstanding that this kind of air, (which the Doctor distinguishes by the name of *putrid air*), proves so very noxious to most animals; yet vegetables thrive in it to a surprising degree. It is also impossible for them to be kept clean from swarms of insects; which Dr Priestley was frequently obliged to brush off the sprigs of mint on which he made his experiments.

Inflammable air was first observed by Mr Cavendish. He obtained it from a solution of iron, zinc, or tin, in the marine acid. Doctor Priestley hath found, that this air may be procured from every inflammable substance, either animal, mineral, or vegetable, by combustion alone. From these substances he extracted it, by heating them in a gun-barrel, to the orifice of which a glass-tube or tobacco-pipe was luted, and to this was tied a flaccid bladder, in order to catch the generated air: but, in order to get a great quantity of air, it was necessary to apply the heat as suddenly; and as vehemently, as possible. By this treatment, a bit of dry oak, weighing twelve grains, will yield a sheep's bladder full of air, while only two or three ounces measures of it can be obtained if the heat is slowly applied.

Inflammable air, when made by a quick process, has a strong offensive smell, from whatever substance it is extracted. It differs, however, according to the substance from which it is obtained; and is most fetid when procured from animal bodies. If a quantity of this kind of air is contained in a glass vessel standing inverted in water, it will even smell through the water; which will soon become covered with a thin film, assuming all the different colours. If the air has been generated from iron, the film will be a red ochre; if from zinc, it is a whitish substance, probably the calx of that metal; it likewise settles to the bottom; and, when the water is stirred, has very much the appearance of wool. When water is once impregnated in this manner, it continues to yield this scum for a considerable time after the air is removed.

This kind of air is no less noxious to animals than the fixed or putrid kinds. It was generally thought to be immiscible with water: but Dr Priestley hath observed four instances of its entirely losing the inflammable property, and being reduced to half its bulk, by long standing in a bottle inverted in water. In this state it extinguished candles much more freely than that air in which they had formerly burnt out, and instantly killed animals that were put into it.

³² Explodes on the approach of flame.

If inflammable air, contained in a vial, be mixed with an equal quantity of common air, it will instantly explode on the approach of flame. If less than an e-

qual quantity of common air is introduced, a number of explosions may be produced from the same quantity of inflammable air; only taking care to stop the mouth of the vial immediately after every explosion, otherwise the inflammable air will continue burning, though invisibly in the day-time, till the whole is consumed. A small mixture of the fumes of smoking spirit of nitre, makes it go off at once, as if mixed with an equal quantity of common air. This kind of air Dr Priestley could not kindle without bringing it into contact with a substance actually flaming; but Mr Volta, inventor of the *electrophorus* or perpetual electrifying machine, hath succeeded in firing it by the simple electric spark, even when the electricity is very moderate, by a well lighted coal without any flame, by a red hot iron, and even by a flint and steel.

Upon trial, with fixed air, the inflammable kind seemed incapable of mixing with it. Even after equal quantities of the two had been confined together in a vial for three years, they did not seem to have at all united, or affected one another; the fixed air being absorbed by water, and the inflammable air exploding as usual.

³⁴ Inflammable air can not be mixed with fixed air.

Vegetables continued to grow in this kind of air, but without making it lose its inflammability, or become fit for respiration. This could be accomplished only by agitation in water. By agitating a large quantity of inflammable air in water, one fourth of it disappeared in ten minutes, and a mouse lived 20 minutes in 24 ounce measures of the remainder; which is as long as that creature can live in the same quantity of common air. The air was yet, however, inflammable, though very weakly so. By a continuance of the agitation, this air admitted a candle to burn in it; and at last came to extinguish it like that in which a candle had burned out. The degree of diminution suffered by this kind of air when it lost its inflammability, was about one half. Distilled water imbibed about one fourteenth of its bulk of inflammable air; but the taste was not sensibly altered.

³⁵ Rendered salutary by agitation in water.

A mixture of iron-filings and brimstone, made into a paste with water, diminished the air in which it stood, between one fourth and one fifth of its whole quantity; which then became rather lighter than common air. In this state it is highly noxious; has a very pungent and offensive smell; nor is it meliorated by standing in water.—The diminution in this, as well as in other cases, Dr Priestley concludes to arise from a deposition of the fixed air, owing to a superabundant quantity of phlogiston being introduced.

All the acids have been reduced by Dr Priestley into the form of air. He begins with the nitrous, which is obtained from a solution of any kind of metallic substance in that acid. From gold, and the regulus of antimony, it is obtained by means of aqua regia. He hath even found that it may be obtained in great plenty from common water. See WATER.

³⁶ Nitrous air.

One of the most conspicuous properties of this air is the great diminution of any quantity of common air with which it is mixed, attended with a turbid red or deep orange colour, exactly like that which appears on untopping a bottle containing smoking spirit of nitre, which the air itself very much resembles in smell. This diminution is attended with a considerable degree of heat.

Air.

If one ounce measure of nitrous, be put to double the quantity of common air, in a few minutes the mixture will want one ninth of the original quantity; and if both kinds of air be very pure, the diminution will fill go on very slowly, till the whole, in a day or two, is reduced to one fifth less than the original quantity of common air. After this saturation of common with nitrous air, a fresh quantity of the latter makes an addition equal to its own bulk, without producing the least redness, or other visible effect.—The diminution in this mixture, was found to arise from a precipitation of the fixed part of the common air, and the condensation of the nitrous air into the acid, called spirit of nitre. The precipitation of fixed air appeared, when the process was conducted in lime-water, by its becoming turbid, though a small quantity of this water put into the vessel was not affected by it. The condensation was evident by the acid taste communicated to water in which this process had been conducted; and Mr Beveley has observed, that, without a mixture of common air, the condensation of nitrous air will not take place.

37
Nitrous air
a test of the
goodness of
common air

It is also very remarkable, that the effervescence with nitrous air is peculiar to common air, or that fit for respiration; and this exactly in proportion to its goodness; that is, the more pure, or fit for respiration, any quantity of air is, the greater degree of redness will be communicated to it on the admixture of nitrous air, and vice versa. Thus the Doctor was furnished with a most accurate method of measuring the degree of goodness of any kind of air he had occasion to try.—This test is equally applicable to air, on whatever account it is rendered unfit for respiration; not the least effervescence being made between the nitrous and fixed, inflammable, putrid, or any species of noxious air. By this test he was able to discover, that air in which candles had burned out, was thereby rendered about one third worse than common air.

Inflammable air, mixed with nitrous, burns with a green flame. Equal proportions of oil of vitriol and spirit of nitre produced nitrous air; but with a less proportion of the nitrous acid, an inflammable kind, burning with a green flame, was produced.

38
Nitrous air
diminished
by a mixture
of iron filings
and brimstone.

By a mixture of iron filings and brimstone, made into a paste with water, nitrous air is remarkably diminished; no more than one fourth of the original quantity being left in one hour after the effervescence of the iron and brimstone has begun; which generally takes place in about five or six hours after the mixture has been made. The glass in which this mixture was made, usually acquired such a degree of heat, that it could not be touched.

Nitrous air, thus diminished, has not so strong a smell as at first, but smells exactly like common air diminished by the same mixture. It is not then capable of being further diminished by a fresh mixture of iron and brimstone. Nor is common air, saturated with nitrous, any farther diminished by a mixture of iron and brimstone; though the mixture ferments with great heat, and swells very much in it.

This kind of air, as well as common air saturated with nitrous, proves fatal both to vegetable and animal life. Neither of these differ in specific gravity from the common atmospheric air.

Distilled water absorbs nitrous air with great avidi-

ty, and acquires from it a remarkably acid and astringent taste, with a peculiarly pungent smell. A filmy kind of substance is also precipitated by the union of this kind of air with water. The Doctor supposes it to be a calx of the metal employed in producing the nitrous air.

The most remarkable, and, as Dr Priestley observes, probably the most useful, property of this kind of air, is its power of preserving animal substances from putrefaction, and restoring those that are already putrid; which it possesses in a degree far superior to fixed air. In the months of July and August, 1772, the Doctor put two mice, one of them just killed, the other soft and putrid, into the same jar of nitrous air; and after 25 days, having observed little or no change in the quantity of the air, he took them out; when both were found perfectly sweet: that which had been put into the jar when just dead, was quite firm; the other continued soft, but perfectly sweet.—A mouse inclosed for a month in fixed air, became insufferably offensive.

39
Prodigious
antiseptic
power of ni-
trous air.

Though this kind of air may be obtained from all metallic substances, yet it is got with difficulty from some metals, and the proportion yielded by them is very different. Iron yields the greatest quantity, sixteen ounce measures of air being obtained from 20 grains of this metal; next to iron, copper, or brass, yield the most; after them silver, quicksilver, &c. In attempting to get nitrous air from zinc, the following phenomena occurred.

Four penny-weights, and seventeen grains of zinc being dissolved in spirit of nitre diluted with an equal quantity of water, yielded twelve ounce measures of air, which was in some degree nitrous. The solution being boiled in a sand heat, some air came from it, which appeared to be the same with nitrous air diminished about $\frac{1}{2}$, or $\frac{2}{3}$, by washing in water. Upon the evaporation of the fluid, there remained a brown fixed substance, which, on an increase of heat, gave out very dense red fumes; and the air was considerably diminished within the receiver. This substance, therefore, the Doctor concludes, must have contained the principle on which the properties of nitrous air depend.

Although the air, however, within the receiver was diminished $\frac{1}{2}$ by this process, it was as much affected by nitrous air, as common air itself is, and a candle burned in it perfectly well.

The Doctor next proceeds to an investigation of the air produced from the fumes of burning charcoal; and he finds, that in this case, as well as in others, a considerable diminution of air is occasioned, and, by the precipitation of lime-water contained in the vessel, there appeared to be a deposition of fixed air. At first he concluded, that the fixed air in this case came from the charcoal; but, considering the intense heat requisite for making charcoal, he thought it more probable it came from the air, as the great heat requisite to calcine the charcoal would have expelled all the air out of it. This, however, was determined in the following manner.

Having suspected, from the experiments with charcoal, that the diminution of air in all cases was owing to the deposition of its fixed part, in consequence of its having more than the usual quantity of phlogiston; the calcination of metals, which are supposed to contain nothing else than a particular kind of earth united to phlogiston,

40
Phenomena
observed in
the calcina-
tion of met-
als.

Air. phlogiston, appeared to be the most certain method of determining this point. Pieces of lead and tin were accordingly suspended in given quantities of air, and had the focus of a burning mirror thrown upon them, so as to make them fume copiously. A great diminution of the air immediately took place; it became in the highest degree noxious, made no effervescence with nitrous air, nor was farther diminished by a mixture of iron-filings and brimstone.

47
Calcination of metals depends on the absorption of fixed air.

The water over which metals have been calcined, acquires a yellowish tinge, and an exceedingly pungent smell and taste, much like that over which brimstone has been frequently burned. A thin whitish pellicle, also, covered the surface of the water, and the sides of the vial in which the calcination was made. Mr La Voisier has proved, by some experiments, that the calcination of metals depends entirely on the absorption of fixed air; that, exactly in proportion to the increase of their weight, the air in the receiver which contains them is diminished; and that when all the fixed part of the air has been deposited, the calcination cannot proceed farther, until fresh air is admitted. Dr Priestley also has observed, that lime-water is not precipitated by having metals calcined over it; but it always acquires the peculiar smell and taste above-mentioned. The reason why none of the lime is precipitated in this case, is, that the metallic calx has a greater affinity with fixed air than lime has, and consequently absorbs it preferably to the lime.

41
Diminution of air accounted for in all cases.

From all these experiments, and many more than what can be mentioned here, the Doctor concludes, that in all cases the diminution of the air is owing to the deposition of its fixed part; which happens in consequence of a saturation with phlogiston: that the inflammable principle, having a greater affinity with some of the constituent parts of the air than its fixed part, unites with them in preference to the other; which immediately joins itself to whatever has a tendency to absorb it. When an animal or vegetable putrefies, the phlogistic matter, together with all its other constituent parts, is let loose, which he supposes to be the cause of the diminution of the air in that case. When iron ferments with brimstone and water, there is an evident escape of phlogiston, by the metal's being reduced to calx. The same must necessarily happen upon the ignition of charcoal; and as spirit of nitre has a very strong affinity with phlogiston, it is highly probable that nitrous air diminishes common air, by imparting phlogiston to it, while the acid of the nitrous air, uniting with the aqueous part of the atmosphere, condenses into a liquor.

43
True composition of air suspected

As for the Doctor's experiments on the other kinds of acid and alkaline air, as they come more properly under CHEMISTRY, we shall here only mention, that from the fume of the marine acid he always obtained inflammable air, by putting to it spirit of wine, oil of olives, oil of turpentine, charcoal, phosphorus, bees wax, and even sulphur. This made him suspect, that the common air we breathe, was no other than some kind of acid united with phlogiston; and that it really was so, he discovered by the following experiments.

44
Discovered.

Having exposed *mercurius calcinatus per se* to the focus of a burning glass twelve inches diameter, he obtained air from it very plentifully. This air, he found, was not absorbed by water; a candle burned with a very

vigorous and greatly enlarged flame; a piece of red-hot wood sparkled in it like paper dipped in a solution of nitre, and consumed very fast.—The same properties he observed in air drawn from red precipitate. From minium, he extracted air of the very same kind. One third of this air, indeed, was readily absorbed by water; but in the remainder, a candle burned very strongly, and with a crackling noise.

After some time, it occurred to him to apply the test of nitrous air to that which he had newly procured; and, upon so doing, he found that it was fully as much diminished as common air. From hence he concluded, that this air was respirable. Accordingly, he put a mouse into two ounce measures of air, obtained from *mercurius calcinatus per se*. Had it been common air, he knew that this creature would have lived a quarter of an hour in such a quantity. In the dephlogisticated air, however, as Dr Priestley calls it, the mouse lived a full half hour; nor did it, when taken out, shew signs of being injured any otherwise than by cold, as it presently revived upon being held to the fire. The remainder of the air which had been so long breathed by the mouse, and which, had it been common air, would have been in the highest degree noxious, was still found to be much better than common air, being reduced by nitrous air to almost one half of its original quantity.

From this quality of taking more phlogiston from nitrous air, than common air was capable of doing, he concluded, that it must originally contain less of that principle than common air. In his experiments to know why this kind of air comes to be so much dephlogisticated, he at last hit upon a method of producing very pure air readily, and in considerable quantity. Having moistened half an ounce of red lead with spirit of nitre, and then dried the mass, he obtained from it not quite a pint of dephlogisticated air, exceedingly pure, in which a candle burned very briskly; and which seemed to be about five times as pure as common air. From this experiment, the Doctor concluded, that the nitrous acid was that which gave the minium power to emit this dephlogisticated air. The vitriolic and marine acids were tried without effect. No air of any kind was produced by treating them in the same manner. The minium effervesced violently with all the acids.

For the same purpose, the Doctor tried, with success, flowers of zinc, chalk, quicklime, slaked lime, tobacco-pipe-clay, flint, Muscovy talcs, and even glass itself; from all which he draws the general conclusion, "That the air we breathe consists of the nitrous acid and earth, with as much phlogiston as is necessary to its elasticity; and likewise as much more as is necessary to bring it from its state of perfect purity, to the mean condition in which we find it." The residuum of his distillation, he found equally fit with fresh earth for the production of more air, upon being again moistened with the spirit of nitre. In his third volume, published in 1777, the Doctor acquaints us, that very pure dephlogisticated air is produced by simply distilling a solution of any metal in the nitrous acid: and Mr Bewley found even that trouble unnecessary; nothing more being requisite, than to moisten red lead with the spirit of nitre, and then pour upon it oil of vitriol; when the dephlogisticated air would immediately be expelled without any more heat being required than what was generated by the mixture. The Doctor hath also endeavoured to determine the proportions

Air.

Air. tions of earth and nitrous acid, required to produce this kind of air; but hitherto without success. Air, he finds, will take up a great deal of earth when hot, which it deposits when cold. See EARTH.

45 The use of blood in animals. We shall conclude this subject with some observations which the Doctor has made on the use of the blood in animals, and on respiration. They are to be found at length in the Philosophical Transactions for the year 1776, and in his third volume on air published in 1777.

46 Respiration a phlogistic process. In his treatise on putrid air, or that infected by animal respiration, he had shewn, that respiration was a phlogistic process; and that by means of it a putrid effluvia was carried off from the body, without which he imagined that a living body might perhaps putrefy as soon as a dead one. In this paper he proves, that the blood is the principal agent in carrying off the superabundant phlogiston; that when the whole mass of blood is successively brought almost into contact with the air in the lungs, it discharges phlogiston into it; and that the blood receives its red florid colour from the air, he proves by the following experiments.

47 Black coloured blood becomes florid by being exposed to the air. Pieces of the nearly black-coloured crassamentum of a sheep's blood, inclosed in nets of open gauze, or wire, having been introduced thro' water or quicksilver into inverted receivers containing common air, received from it a florid red colour, at the same time that the air was considerably depraved.—The brightest red blood became black in phlogisticated or any otherwise depraved air; and resumed its colour again upon being exposed to the fresh air, parting, in this last situation, with the phlogiston it had acquired in the preceding.

That pure air is depraved by the presence of blood, while the colour of it is changed from black to red, the Doctor proved by his very pure dephlogisticated air being considerably vitiated by successively introducing fresh pieces of crassamentum to the same portion of it; and this without any tendency to putrefaction in the blood employed.

48 Remarkable discovery concerning the nature of serum. In the course of his experiments on blood, he made the following remarkable discovery concerning the nature of serum, viz. that a covering of serum several inches deep was no impediment to the action of the air upon the crassamentum of the blood, as it acquired the red colour as easily on being exposed to pure air with this thick coat of serum, as without it; whereas the slightest covering of water, or saliva, effectually prevented any change of colour. On reversing the experiment, he found that phlogisticated air would act upon crassamentum, so as to turn it black, through a covering of serum two inches deep.—From these experiments he concluded, that the serous part of the blood was particularly organized for the purpose of transmitting air through it.

49 Apparatus for making experiments on air. It now remains that we give some account of the apparatus requisite for making experiments on air: and for this purpose it will be sufficient to give an idea of that made use of by Dr Priestley; both as being most easily understood, and likewise, if we may judge from the discoveries he hath made by the use of it, as being the most efficacious of any that hath hitherto been invented.

Plate VII. For experiments in which air will bear to be confined in water, he made use of an oblong wooden trough, fig. 1. two feet long, 11 inches deep, and 18 inches

wide; with a shelf, *bb*, about an inch lower than the top, for the convenience of placing the jars upon it. The several kinds of air are kept in cylindric jars *cccc*, about about 10 inches long, and $2\frac{1}{2}$ wide; though it is necessary, for particular experiments, to have vessels of different forms and sizes. When he has occasion to transfer air from one jar to another in quicksilver, a small oblong trough is absolutely necessary; but, on other occasions, a basin is more convenient for holding the quicksilver.

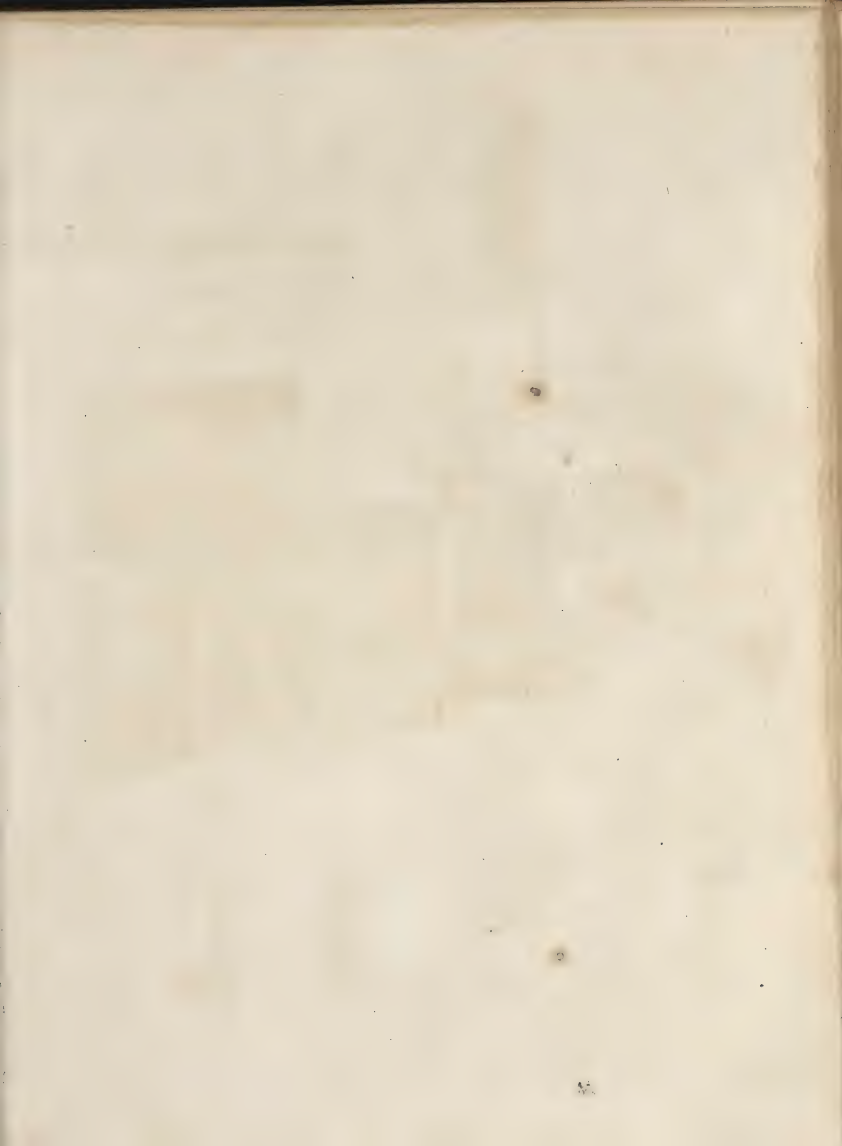
When vessels of air are to be removed from the large trough, they are placed in pots or dishes *ggg*, of different sizes, to hold more or less water as there is occasion. For the purpose of merely removing a jar of air from one place to another, where it is to stand only a few days, common tea-dishes may be used; unless the air be in a state of diminution, when vessels of a larger size must be made use of.

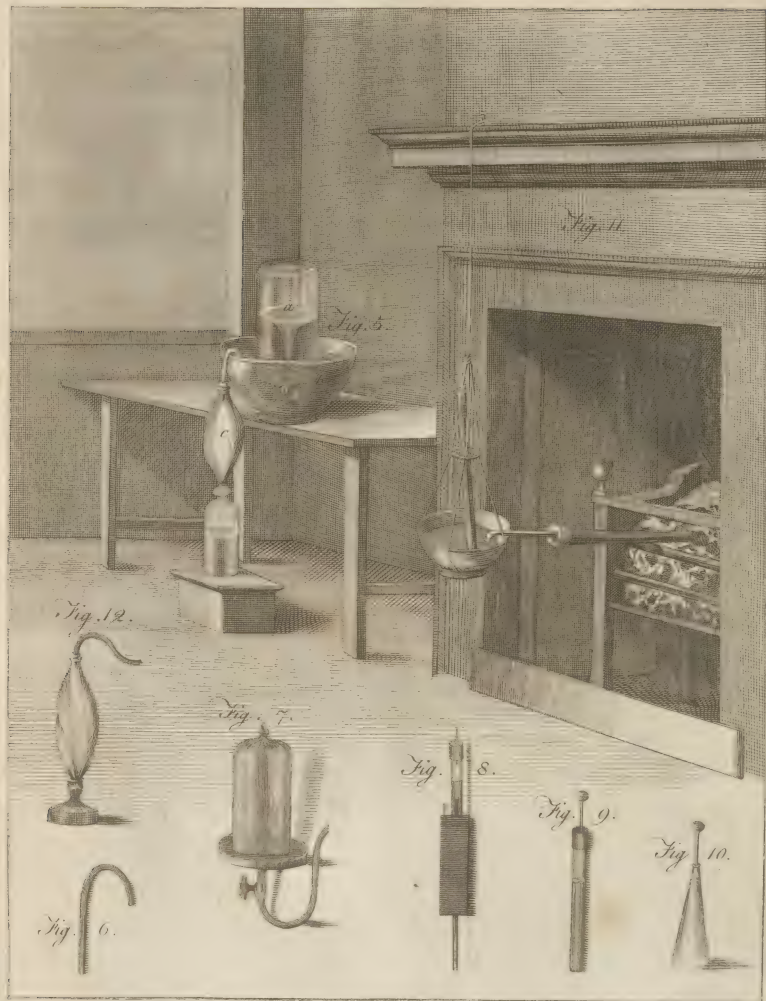
When an experiment is to be tried how long a small animal, a mouse for instance, will live in a certain species of air, a tall beer-glass, such as is represented by *d*, which contains between two and three ounce measures of air, will answer the purpose. In this quantity of common air a mouse will live 20 minutes, or half an hour.—On this occasion the Doctor observes, that mice must be kept in a pretty exact temperature, as they are unable to bear either much heat or much cold. He was also surprized to find that they lived entirely without water; and he had an instance of one mouse tearing another almost in pieces, though there was plenty of provisions at the time for both. The method of putting these creatures into the quantity of air designed for the experiment, is to pass them through the water into the cavity of the glass, into which something must be put for them to fit conveniently out of the reach of the water.—The same method may be used when a plant is to be conveyed into any given quantity of air. If the plant is of such a nature that it will grow in water only, there will be no occasion to set it in a pot of earth, which otherwise will be necessary.

For opening the mouth of a vial, in any quantity of air, without admitting the water into the vial, it is necessary to have a cork cut tapering, with a strong wire thrust through it, (*b*, fig. 1.) by which means it may be introduced into the mouth of an inverted jar, and the cork withdrawn by means of the wire, which afterwards can be replaced by the same means, if there is occasion.—For supporting a gallipot at a considerable height within a jar, it is convenient to have such wire-stands as are represented fig. 2. They answer better than any other, as they take up but little room, and easily bend to any form.

When air is to be poured from a wide-necked, into a very narrow-necked vessel, a glass funnel *e* must be used, by which means the operation is rendered exceedingly easy; first filling the vessel into which the air is to be conveyed with water, and untopping the other containing the air under the funnel, which is inserted into the mouth of the narrow vessel, and immersed in water. The air immediately ascends through the neck of the funnel, makes the water descend, and take its place.

To expel air from solid substances by means of heat, a gun-barrel may be sometimes used, which is filled up with dry sand that has been well burned, fig. 11.









Air.

so that no air can come from it. To the open end is luted the stem of a tobacco-pipe, or a small glass-tube. Having put the closed end of the barrel containing the materials, into the fire, the generated air, issuing through the tube, may be received in a vessel of quicksilver having its mouth inverted into a basin of the flame, suspended all together by wires, in the manner represented in the figure.

But the most accurate method of extracting air from several substances, by means of heat, is to put them, if they will bear it, into vials full of quicksilver, with the mouths immersed in the flame; and then throwing the focus of a burning mirror, or convex lens, upon them. The vials used for this purpose should have their bottoms-round and very thin, that they may not break with a sudden application of heat; for which Florence flasks seem very proper.

If air is to be expelled from any liquid, a vial is nearly filled with it. To the vial is fitted a perforated cork, having a glass tube inserted in it, bent as in *fig. 1.* and secured with cement. The vial is then to be put in a kettle of boiling water, in order to expell the air; or it may be heated by means of a candle, or red-hot poker. But where the air is readily imbibed by water, quicksilver ought always to be used; or if a sufficient quantity of it cannot be procured, oil will in some measure answer the purpose.

Plate VII.

When air is to be transferred from a jar standing in the trough of water to any other vessel, the contrivance *fig. 12.* is made use of. It consists of a bladder furnished at one end with a small tube of glass bent, having at the other a cork perforated, so as just to admit the small end of a funnel. When the common air is pressed out of this bladder, and the funnel thrust tightly into the cork, it may be filled with any kind of air as easily as a glass jar. A string being then tied above the cork in which the funnel is inserted, and the orifice in the other cork closed by pressing the bladder against it, it may be carried to any place; and if the tube be carefully wiped, the air may be conveyed quite free from moisture through a body of quicksilver, or any thing else.

Plate VIII.

To impregnate fluids with air of any kind, as water with fixed air, a vial is filled with the fluid, as *a*, *fig. 5.* It is then inverted in a bowl *b*, containing a quantity of the same fluid; and the bladder *c* being filled with the air, as much of it as is thought proper may be thrown into the vial; and, to accelerate the impregnation, the vial may be shaken as much as possible. The same apparatus serves very conveniently for conveying air immediately as it is generated from an effervescing mixture, into any other species of fluid; and that the vial may be more conveniently shaken, in order to make the effervescence occasionally more brisk, a flexible leather pipe may be sometimes used, instead of the inflexible glass one.

Plate VII.

When any kind of air is to be tried with regard to its capacity for sustaining flame, a cylindrical glass vessel (*fig. 4.*) is made use of, with a bit of wax candle, fastened to the end of a wire, and turned up in such a manner as to be let down into the vessel with the flame upwards. The vessel should be kept carefully covered, till the moment the candle is admitted; and by this means the Doctor has extinguished a candle more than 20 times successively; although it is im-

Vol. I.

possible to dip the candle in it without giving the external air an opportunity of mixing more or less with that in the vessel. The candle at the other end of the wire is very convenient for being held under a jar standing in water, in order to burn as long as the inclosed air can supply it; for, the moment it is extinguished, it may be drawn through the water, before any smoke can have mixed with the air.

Air.

In order to draw air out of a vessel which has its mouth immersed in water, and thereby to raise the water to any height, it is convenient to use a glass syphon, *fig. 6.* putting one of the legs up into the vessel, and drawing the air out of the other by the mouth. If the air is of a noxious quality, it may be necessary to have a syringe fastened to the syphon; or if a very small hole is made in the upper part of a glass-vessel, it may be filled to any height, by holding it under water, while the air is discharged at the hole, which may be afterwards closed with cement.

Plate VIII.

When a particular kind of air is to be admitted to any thing that will not bear wetting, especially if it is a powder, and must be placed on a stand, as in those experiments in which the focus of a burning mirror is to be thrown upon it, a receiver is first exhausted, in which it is previously placed; and having a glass tube bended for the purpose, as in *fig. 7.* it is to be screwed to the stem of a transfer of the air-pump on which the receiver had been exhausted; and introducing it into a jar of that kind of air with which the receiver is desired to be filled, the purpose is gained, by only turning the cock.

To take the electric spark in any kind of air, the quantity of which must be very small, to produce a sensible effect upon it in a short time, a piece of wire is put into the end of a small tube, and fastened with hot cement, as in *fig. 8.* and having got the air desired into the tube, by means of the apparatus already described, it is placed inverted in a basin containing quicksilver or any other fluid substance. By the help of the air-pump, then, as much of the air is driven out as is thought proper; and putting a brass ball on the end of the wire, the sparks, or shocks, are communicated by its means, thro' the air contained in the tube, to the fluid.—If air is generated very fast by this process, a glass is used, *fig. 10.* which is narrow above, and grows wider below, that the quicksilver may not too soon recede beyond the striking distance.

Besides this general apparatus, which hitherto may be considered as merely experimental, and a matter of curiosity only, it will be proper to mention that for impregnating water with fixed air; as water impregnated with this kind of air hath been found exceedingly salutary in putrid distempers, particularly in the sea-scurvy. For this reason, a method of impregnating large quantities of water with fixed air has become an object worthy of public attention. A proposal for doing so was laid before the board of Admiralty, and was accepted of; and the captains of two ships that were just failing for the south seas, had orders to make trial-of the impregnated water; for which purpose Dr Priestley drew out his directions in writing, and sent a drawing of his apparatus.

The apparatus recommended by Dr Priestley for By Dr Priestley. impregnating water, is not in the least different from that represented *fig. 5.* where *a* represents a glass-vessel, A a vessel,

50

Apparatus
for impreg-
nating water
with fixed
air.

51

Air.

veffel, with a pretty narrow neck, but so formed that it will stand upright with its mouth downwards. Having filled it with water, lay a slip of clean paper, or thin pasteboard, upon the mouth: then, if they be pressed close together, the vefsel may be turned upside down, without danger of admitting common air into it; and when thus inverted, it must be placed into another vefsel, in the form of a bowl or bafon, *b*, with a little water in it, so much as to permit the slip of paper or pasteboard to be withdrawn, and the end of the crooked pipe to be introduced. One end of this pipe is inserted into a bladder, which is tied round it; and the other communicates, by means of a perforated cork, with a vial which contains the effervescing mixture, from whence the fixed air is to be detached. On some occasions it may be convenient to have this pipe flexible; when it will be best made of leather sewed with a waxed thread, in the manner used by shoe-makers. When this pipe is flexible, a piece of quill must be thrust into each end of it, to keep them open, while one of them is introduced into the vefsel of water, and the other into the bladder *c*, the opposite end of which must be tied round a cork perforated, and the hole kept open by a quill. The cork must fit the vial containing the effervescing mixture, two-thirds of which must be filled with chalk, just covered with oil of vitriol. The Doctor, however, finds it most convenient to use a glass tube; and, for the advantage of agitating the vial, to have two bladders, communicating by a perforated cork, to which they are both tied.

Things being thus prepared, and the vial containing the chalk and water being detached from the bladder, and the pipe from the vefsel of water, pour a little oil of vitriol upon the chalk and water; and having carefully pressed all the common air out of the bladder, put the cork into the bottle presently after the effervescence has begun. Also, press the bladder once more, after a little of the newly generated air has got into it, in order the more effectually to clear it of all remains of common air; and then introduce the end of the pipe into the mouth of the vefsel of water, as in the drawing, and begin to agitate the chalk and water briskly. This will presently produce a considerable quantity of fixed air, which will distend the bladder; and this being pressed, the air will force its way through the pipe, and ascend into the vefsel of water, the water at the same time descending and coming into the bafon.

When about one half of the water is forced out, let the operator lay his hand upon the uppermost part of the vefsel *a*, and shake it as briskly as he can, not to throw the water out of the bafon; and, in a few minutes, the water will absorb the air; and, taking its place, will nearly fill the vefsel as at first. Then shake the vial containing the chalk and water again, and force more air into the vefsel, till upon the whole an equal bulk of air has been thrown into it. Also shake the water as before, till no more of the air can be imbibed. As soon as this is perceived to be the case, the water is ready for use; and if it is not to be used immediately, should be put, as soon as possible, into a bottle well corked and cemented. It will, however, keep very well, if the bottle be only well corked, and kept with the mouth downwards. A little more than a tea-spoonful of oil of vitriol will be sufficient to impregnate three pints of water with fixed air.

Air.

By this process may fixed air be given to wine, beer, and almost any liquor whatever: and when beer is become flat or dead, it will be revived by this means; and the delicate agreeable flavour, or acidulous taste, communicated by the fixed air, and which is manifest in water, will hardly be perceived in wine, or other liquors, which have much taste of their own.

By the same means also may be prepared water having all the medicinal virtues of Pyrmont water, or any other mineral water similar to it; especially if a few iron-silings be added, to render it a chalybeate like genuine Pyrmont water; which it may be made to resemble exactly, by putting eight or ten drops of *tinctura martis cum spiritu salis* to every pint.

52
Artificial
Pyrmont
water.

The first hint of the uses to which fixed air may be applied, was given by Sir John Pringle; who discovered that putrefaction was checked by fermentation. Doctor Macbride found this to be an effect of the fixed air produced in the process; upon which principle he recommended the use of wort to sailors, as a substitute to fresh vegetables, by supplying a quantity of fixed air from its fermentation in the stomach; which conjecture is now confirmed by experience. Dr Black discovered the existence of fixed air in calcareous substances; Dr Brownrigg claims the discovery of it in Pyrmont, and other mineral waters; and Dr Priestley, that of an easy method of impregnating water with it in large quantities. He also conjectured, that, if applied by way of clyster, it might be of service in putrid fevers; which is likewise verified by experience. The fixed air may be injected into the intestinal canal, by the same apparatus employed for injecting the smoke of tobacco.

The use of bladders in this apparatus was objected to by Dr Nooth; who asserted, that they were apt to communicate an urinous flavour to the water. This he attributed to the action of the solvent power of the air upon the bladder; and he gave a particular kind of apparatus of his own invention, in which, the vessels being entirely made of glass, no inconvenience of this sort could be apprehended.—To Dr Nooth's objections Dr Priestley replied, that he had been conversant with bladders, and fixed air contained in bladders, as much as any man, and never found any such flavour arising from the use of them as Dr Nooth had experienced. He suspected, therefore, that the taste complained of had arisen from the carelessness of the servant, and that urine had really been mixed with the water made use of. He owned, however, that the apparatus recommended by Dr Nooth, and improved by Mr Parker, had in some respects the advantage of his own, particularly in being more cleanly to the operator, and requiring less attendance; though it was more inconvenient, where large quantities of water were to be impregnated, on account of its being much slower.

53
Dr Nooth's
apparatus.

This apparatus is represented, fig. 3. In the lowest Plate VII. vefsel, the chalk, or pounded marble, (which last is preferred by Dr Priestley), and the water acidulated with oil of vitriol, is to be put; in the middle vefsel is the water to be impregnated, the descent of which is prevented by the ascent of the fixed air. During the effervescence, the fixed air rises into the middle vefsel, displaces part of the water in it, thro' the bent tube into the upper vefsel, the common air going out through a channel in the stopple. When this bent tube

Air,
in Music.

tube is of a proper length, the process requires no attention; and if the production of air be copious, the water will generally be sufficiently impregnated in five or six hours. At least, all the attention that needs be given to it is to raise the uppermost vessel once or twice, to let out that part of the fixed air which is not readily absorbed by water. If the operator chuses to accelerate the process by agitating the mixture, he must separate the two uppermost vessels from the lowest, or the air will be too copiously produced, and he will also be in danger of throwing the liquor contained in the lowest vessel, in contact with the flopple which separates it from the middle vessel, by which means some of the oil of vitriol might get into the water.

Fluor-acid Air	} See CHEMISTRY	n° 264.
Marine-acid Air		n° 226, 262.
Vegetable-acid Air		n° 289.
Vitriolic-acid Air		n° 163.

AIR, in mythology, was adored by the heathens under the names of Jupiter and Juno; the former representing the superior and finer part of the atmosphere, and the latter the inferior and grosser part. The augurs also drew presages from the clouds, thunder, lightning, &c.

AIR, in painting, &c. denotes the manner and very life of action; or it is that which expresses the disposition of the agent.—It is sometimes also used in a synonymous sense with gesture or attitude.

AIR, in music, is taken in different senses. In a vulgar acceptation, it signifies any particular manner of execution: thus, we say of a practical musician, that he performs with a good or bad, proper or improper, *air*. But this is certainly a solecism of speech. The animating graces, and moving touches, with which melody is adorned and heightened in execution, are resolvable either into manner or expression.—*Air* is likewise sometimes contrasted with harmony; and, in this sense, it is synonymous with melody in general.—Its proper meaning is, A tune, which is set to words, or to short pieces of poetry that are called *songs*.

In operas, we give the name of *air* to such pieces of music as are formed with measures and cadences, to distinguish it from the recitative; and, in general, every piece of music is called an *air*, which is formed for the voice, or even for instruments, and adapted to stanzas, whether it forms a whole in itself, or whether it can be detached from any whole of which it forms a part, and be executed alone.

If the subject admits of harmony, and is set in parts, the *air* is, according to their number, denominated a *duet*, a *trio*, a *quartetto*, &c. We need not follow Rousseau, and the other philologists, in their endeavours to investigate the etymon of the word *air*. Its derivation, though found and ascertained, would contribute little to illustrate its meaning in that remote sense, to which, through a long continuance of time, and the various vicissitudes of language, it has now passed. The curious may consult the same article in the *Dictionnaire de Musique* by M. Rousseau.

In modern music, there are several different kinds of *airs*, each of which agrees to a certain kind of dancing, and from these dances the *airs* themselves take their specific names. See MUSIC, Art. 252.

The *airs* of our operas, are, if we may be permitted the expression, the canvás or substratum upon which

are painted all the pictures of imitative music; melody is the design, and harmony the colouring: every picturesque object selected from the most beautiful parts of nature, every reflected sentiment of the human heart, are the models which the artist imitates; whatever gains attention, whatever interests the soul, whatever charms the ear, or causes emotion in the heart, these are the objects of his imitation*. An *air* which delights the ear, and discovers the learning of the composer; an *air* invented by genius, and composed with taste; is the noblest effort of music: it is this which explores the compass, and displays the delicacy, of a beautiful voice; it is in this where the charms of a well-conducted symphony shine; it is by this, that the passions, excited and inflamed by nice gradations, reach and agitate the soul through the avenues of external sense. After hearing a beautiful *air*, the mind is acquiescent and serene: the ear is satisfied, not disgusted: it remains impressed on the fancy, it becomes a part of our essence, we carry it with us, we are able to repeat it at pleasure: without the ability acquired by habit to breathe a single note of it, we execute it in our imagination in the same manner as we heard it upon the theatre: one sees the scene, the actor, the theatre; one hears the accompaniments and the applauses. The real enthusiast in music never forgets the beautiful *airs* which he has heard; when he chuses, he causes the opera to recommence.

The words to which *airs* are adapted, are not always rehearsed in regular succession, nor spoken in the same manner with those of the recitative; and though, for ordinary, they are very short, yet they are interrupted, repeated, transposed, at the pleasure of the artist. They do not constitute a narrative, which once told is over: they either delineate a picture, which it is necessary to contemplate in different points of view; or inspire a sentiment in which the heart acquiesces with pleasure, and from which it is neither able nor willing to be disengaged; and the different phrases of the *air*, are nothing else but different manners of beholding the same image. This is the reason why the subject of an *air* should be one. It is by these repetitions properly placed, it is by these redoubled efforts, that an impression, which at first was not able to move you, at length shakes your soul, agitates you, transports you out of yourself: and it is likewise upon the same principle, that the runnings as they are called, or those long, mazy, and articulated inflections of the voice, which, in pathetic *airs*, frequently seem, though they are not always so, improperly placed; whilst the heart is affected with a sentiment exquisitely moving, it often expresses its emotions by inarticulate sounds, more strongly and sensibly than it could do by words themselves.

The form of *airs* is of two kinds. The small *airs* are often composed of two strains, which ought each of them to be sung twice; but the important *airs* in operas, are frequently in the form of rondeaus.

AIRS, in the menage, are the artificial motions of taught horses; as the demivolt, curvet, capriole, &c.*

AIR-Bladder, in fishes. See COMPARATIVE ANATOMY, n° 147.

AIR-Gun, a pneumatic machine for exploding bullets, &c. with great violence.

The common air-gun is made of brass, and has two barrels; the inside barrel A, fig. 1. which is of a small bore, from whence the bullets are exploded; and a large barrel

Air,
in Music.* See LUTE-
RIO.* See DEMI-
VOLT, &c.

Plate IX.

Air-gun.

barrel E C D R on the outside of it. There is a syringe S M N P fixed in the flock of the gun, by which the air is injected into the cavity between the two barrels through the valve E P. The ball K is put down into its place in the small barrel, with the rammer, as in any other gun. At S L is another valve, which, being opened by the trigger O, permits the air to come behind the bullet, so as to drive it out with great force. If this valve be opened and shut suddenly, one charge of condensed air may be sufficient for several discharges of bullets; but if the whole air be discharged on one single bullet, it will drive it out with a great force. This discharge is effected by means of a lock, fig. 2. placed here as usual in other guns; for the trigger being pulled, the cock will go down and drive the lever O, fig. 1. which will open the valve, and let in the air upon the bullet K.

The *Magazine Air-gun* was invented by that ingenious artist L. Colbe. By this contrivance ten bullets are so lodged in a cavity, near the place of discharge, that they may be drawn into the shooting-barrel, and successively discharged so fast as to be nearly of the same use as so many different guns.

Fig. 3. represents the present form of this machine, where part of the flock is cut off, to the end of the injecting syringe. It has its valve opening into the cavity between the barrels, as before. K K is the small shooting-barrel, which receives the bullets from the magazine E D, which is of a serpentine form, and closed at the end D when the bullets are lodged in it. The circular part *abc*, is the key of a cock, having a cylindric hole through it, *ik*, which is equal to the bore of the same barrel, and makes a part of it in the present situation. When the lock is taken off, the several parts Q, R, T, W, &c. come into view, by which means the discharge is made by pushing up the pin P *p*, which raises and opens a valve V, to let in the air against the bullet I, from the cavity F F; which valve is immediately shut down again by means of a long spring of brass, N N. This valve V being a conical piece of brass, ground very true in the part which receives it, will of itself be sufficient to confine the air.

To make a discharge, you will pull the trigger Z Z, which throws up the sear *y*, and disengages it from the notch *a*, upon which the strong spring W W moves the tumbler T, to which the cock is fixed. This, by its end *u*, bears down the end *v* of the tumbling lever R, which, by the other end *m*, raises at the same time the flat end of the horizontal lever Q; and by this means, of course, the pin F *p*, which stands upon it, is pushed up, and thus opens the valve V, and discharges the bullet. This is all evident from a bare view of the figure.

To bring another bullet to succeed that marked I, instantaneously, turn the cylindric cavity of the key of the cock, which before made part of the barrel K K, into the situation *ik*, so that the part *i* may be at K; and hold the gun upon your shoulder, with the barrel downwards, and the magazine upwards, by which means that bullet next the cock will fall into it out of the magazine, but go no farther into this cylindric cavity than the two little springs *s s*, which detain it. The two circles represent the cock-barrel, wherein the key abovementioned turns upon an axis not represented here, but visible in fig. 4. This axis is a square

piece of steel, on which comes the square hole of the hammer H, fig. 5; by which the cylindric cavity mentioned is opened to the magazine. Then opening the hammer, as in that figure, the bullet is brought into its proper place near the discharge-valve, and the cylindric cavity of the key of the cock again makes part of the inward barrel K K.

It evidently appears how expeditious a method this is of charging and discharging a gun; and were the force of condensed air equal to that of gunpowder, such an air-gun would answer the end of several guns.

In the air-gun, and all other cases where the air is required to be condensed to a very great degree, it will be requisite to have the syringe of a small bore, viz. not exceeding half an inch in diameter; because the pressure against every square inch is about 15 pounds, and therefore against every circular inch about 12 pounds. If therefore the syringe be one inch in diameter, when one atmosphere is injected, there will be a resistance of 12 pounds against the piston; and when 10 are injected, there will be a force of 120 pounds to be overcome; whereas ten atmospheres act against the circular half-inch piston (whose area is only one-fourth part so big) with only a force equal to 30 pounds; or 40 atmospheres may be injected with such a syringe, as well as 10 with the other. In short, the facility of working will be inversely as the squares of the diameter of the syringe.

Air-Jacket, a sort of jacket made of leather, in which are several bags, or bladders, composed of the same materials, communicating with each other. These are filled with air through a leather tube, having a brass stop-cock accurately ground at the extremity, by which means the air blown in through the tube is confined in the bladders. The jacket must be wet, before the air be blown into the bags, as otherwise it will immediately escape through the pores of the leather. By the help of these bladders, which are placed near the breast, the person is supported in the water, without making the efforts used in swimming.*

Air-Pipes, an invention for drawing foul air out of ships, or any other close places, by means of fire. These pipes were first found out by one Mr Sutton, a brewer in London; and from him have got the name of *Sutton's Air-pipes*. The principle on which their operation depends is known to every body, being indeed no other than that air is necessary for the support of fire; and, if it has not access from the places most adjacent, will not fail to come from those that are more remote. Thus, in a common furnace, the air enters through the ash-hole; but if this is closed up, and a hole made in the side of the furnace, the air will rush in with great violence through that hole. If a tube of any length whatever is inserted in this hole, the air will rush through the tube into the fire, and of consequence there will be a continued circulation of air in that place where the extremity of the tube is laid. Mr Sutton's contrivance then, as communicated to the Royal Society by Doctor Mead, amounts to no more than this.—“As, in every ship of any bulk, there is already provided a copper or boiling-place proportionable to the size of the vessel; it is proposed to clear the bad air, by means of the fire already used under the said coppers or boiling-places for the necessary uses of the ship.

Air-pipes.

* See also the articles CORK-Jacket, and BAMBOO-Habit.

Air-pipes.

"It is well known, that, under every such copper or boiler, there are placed two holes, separated by a grate; the first of which is for the fire, and the other for the ashes falling from the fame; and that there is also a flue from the fire-place upward, by which the smoke of the fire is discharged at some convenient place of the ship.

"It is also well known, that the fire once lighted in these fire-places, is only preserved by the constant draught of air through the forementioned two holes and flue; and that if the said two holes are closely stopped up, the fire, though burning ever so briskly before, is immediately put out.

"But if, after shutting up the abovementioned holes, another hole be opened, communicating with any other room or airy place, and with the fire; it is clear, the said fire must again be raised and burn as before, there being a like draught of air through the same as there was before the stopping up of the first holes; this case differing only from the former in this, that the air feeding the fire will now be supplied from another place.

"It is therefore proposed, that, in order to clear the holds of ships of the bad air therein contained, the two holes abovementioned, the fire-place and ash-place, be both closed up with substantial and tight iron-doors; and that a copper or leaden pipe, of sufficient size, be laid from the hold into the ash-place, for the draught of air to come in that way to feed the fire. And thus it seems plain, from what has been already said, that there will be, from the hold, a constant discharge of the air therein contained; and consequently, that that air, so discharged, must be as constantly supplied by fresh air down the hatches or such other communications as are opened into the hold; whereby the same must be continually freshened, and its air rendered more wholesome and fit for respiration.

"And if into this principal pipe so laid into the hold, other pipes are let in, communicating respectively either with the well or lower decks; it must follow, that part of the air, consumed in feeding the fire, must be respectively drawn out of all such places to which the communication shall be so made."

This account is so plain, that no doubt can remain concerning the efficacy of the contrivance; it is evident, that, by means of pipes of this kind, a constant circulation of fresh air would be occasioned thro' those places where it would otherwise be most apt to stagnate and putrefy. Several other contrivances have been used for the same purpose; and Doctor Hales's ventilators, by some unaccountable prejudice, have been reckoned superior in efficacy and even simplicity to Mr Sutton's machine, which at its first invention met with great opposition*, and even when introduced by Dr Mead, who used all his interest for that purpose, was shamefully neglected.

A machine capable of answering the same purpose was invented by Mr Defaguliers, which he called the *ship's lungs*. It consisted of a cylindrical box set up on its edge, and fixed to a wooden pedestal. From the upper edge of the box issued a square trunk open at the end, and communicating with the cavity of the box. Within this box was placed a cylindrical wheel turning on an axis. It was divided into 12 parts, by means of partitions placed like the radii of a circle. These par-

titions did not extend quite to the centre, but left an open space of about 18 inches diameter in the middle; towards the circumference, they extended as far as possible without interfering with the case, so that the wheel might always be allowed to turn freely.—Things being thus circumstanced, it is plain, that if the wheel was turned towards that side of the box on which the trunk was, every division would push the air before it, and drive it out through the trunk, at the same time that fresh air would come in through the open space at the centre, to supply that which was thrown out thro' the trunk. By turning the wheel swiftly, a strong blast of air would be continually forced out thro' the square trunk, on the same principles on which a common fan-ner winnows corn. If the wheel is turned the opposite way, a draught of air may be produced from the trunk to the centre.—If this machine, then, is placed in a room where a circulation of air is wanted, and the trunk made to pass through one of the walls; by turning the wheel swiftly round, the air will be forced with great velocity out of that room, at the same time that fresh air will enter through any chinks by which it can have access to supply that which has been forced out.

It is evident, that the circulation which is promoted by this machine, is entirely of the same kind with that produced by Mr Sutton's; the turning of the wheel in Mr Defaguliers's machine being equivalent to the rarefaction of the air by fire in Mr Sutton's; but that the latter is vastly superior, as acting of itself, and without intermission, requires no arguments to prove. Mr Sutton's machine has yet another convenience, of which no other contrivance for the same purpose can boast; namely, that it not only draws out putrid air, but destroys it by causing it pass through fire; and experience has abundantly shewn, that though putrid air is thrown into a great quantity of fresh air, it is so far from losing its pernicious properties, that it often produces noxious diseases. We do not say, indeed, that putrid air becomes salutary by this means; but it is undoubtedly rendered less noxious than before; tho' whether it is equally innocent with the smoke of a fire fed in the common way, we cannot pretend to determine.

Besides this machine by Mr Defaguliers, the ventilators of Doctor Hales, already mentioned, and those called *Wind-sails*, are likewise used for the same purpose. The former of which is an improvement of the *Hessian-bellows**: the other is a contrivance for throwing fresh air into those places where putrid air is apt to lodge; but this has the last-mentioned inconvenience in a much greater degree than any of the others, as the blast of fresh air throws out that which was rendered putrid by stagnation, in such a manner as to contaminate all around it. See *WIND-SAILS*.

Air-Trunk, is also a contrivance by Doctor Hales to prevent the stagnation of putrid effluvia in jails, and other places where a great number of people are crowded together in a small space. It consists only of a long square trunk open at both ends; one of which is inserted into the ceiling of the room, the air of which is required to be kept pure; and the other extends a good way beyond the roof. Through this trunk a continued circulation is carried on: and the reason is, that the putrid effluvia which do so much mischief when collected, being much lighter than the pure atmosphere, arise to the top of the room; and, if they there find a

* See *Ventilator*.* See *Sutton*.

vent,

Air-trunks vent, will continually go out through it. These effluvia arise in very considerable quantity, being calculated by the late Dr Keil at no less than 39 ounces from one man in 24 hours.

These trunks were first made trial of by Mr Yeoman, over the House of Commons, where they were nine inches wide within; and over the Court of King's-bench in Westminster-hall, where they were six inches wide. They are sometimes made wider, and sometimes narrower: but the wider they are, the longer they ought to be, more effectually to promote the ascent of the vapour. The reason why vapours of this kind ascend more swiftly through a long trunk than a short one, is, that the pressure of fluids is always according to their different depth, without regard to the diameter of their basis, or of the vessel which contains them; and, upon this principle, a gallon of water may be made to split a strong cask*. When the column of putrid effluvia is long and narrow, the difference between the column of atmosphere pressing on the upper end of the trunk, and that which presses on the lower end, is much greater than if the column of putrid effluvia was short and wide; and consequently the ascent is much swifter.—One pan of a single pair of scales, which was two inches in diameter, being held within one of these trunks, over the house of commons, the force of the ascending air made it rise so as to require four grains to restore the equilibrium, and this when there was no person in the house; but when it was full, no less than 12 grains were requisite to restore the equilibrium; which clearly shews that these trunks must be of real, and very great efficacy.

Air-Pump, a machine by which the air contained in a proper vessel may be exhausted, or drawn out*.

Air-Shafts, among miners, are holes made to meet the adits, and supply them with fresh air.

Air-Threads, in natural history, a name given to the long filaments, so frequently seen in autumn floating about in the air.

These threads are the work of spiders, especially of that species called the long-legged field-spider; which, having mounted to the summit of a bush or tree, darts from its tail several of these threads, till one is produced capable of supporting the creature in the air: on this it mounts in quest of prey, and frequently rises to a very considerable height. See ARANEA.

Air-Vessels, are spiral ducts in the leaves, &c. of plants, supposed to be analogous to the lungs of animals, in supplying the different parts of a plant with air. See PLANTS, n° 35. and the figure there referred to.

AIRA, in botany, a genus of the triandria digynia class. There are 14 species of the aira, nine of which are natives of Britain. The English name is *Hair-grass*. See the general article GRASS.

AIRANI, in church-history, an obscure sect of Arians, in the fourth century, who denied the consubstantiality of the Holy Ghost with the Father and the Son. They are otherwise called *Airanists*; and are said to have taken their name from one *Airan*, who distinguished himself at the head of this party, in the reigns of Valentinian and Gratian.

AIRE, in geography, a sea-port town in Scotland, situated in N. lat. 55. 30. and W. long. 4. 40. at the mouth of a river of the same name, which discharges itself into the frith of Clyde. Aire is the chief town of the county, and very ancient. About a mile north

from the town, there is a lazar-house, commonly called *the King's chapel*, which King Robert de Bruce set apart for the maintenance of lepers.

AIRE, a town of France, in Proper Gascony, of which it is the capital, with a bishop's see. It is seated on the river l'Adour, on the declivity of a mountain. E. Long. o. 3. N. Lat. 43. 47.

AIRE, a strong town in the Netherlands, in the county of Artois, with a castle. It was taken by the French in 1710, and was confirmed to them by the treaty of Utrecht. It is seated on the river Lis, 22 miles south of Dunkirk, and communicates with St Omer's by a canal cut from the river Aa. E. Long. 2. 31. N. Lat. 50. 38.

AIRESHIRE, a county of Scotland, the capital of which is the town of Aire. It lies eastward of the frith of Clyde.

AIRING, a term peculiarly used for the exercising horses in the open air. It purifies the blood; purges the body from gross humours; and, as the jockies express it, teaches the horse how to make his wind rake equally, and keep time with the other motions of his body. It also sharpens the stomach, and keeps the creature hungry; which is a thing of great consequence, as hunters and racers are very apt to have their stomach fall off, either from want of exercise, or from the too violent exercise which they are often exposed to. If the horse be over fat, it is best to air him before sun-rise, and after sun-setting; and in general, it is allowed by all, that nothing is more beneficial to those creatures than early and late airings. Some of our modern managers, however, dispute this: they say, that the cold of these times is too great for the creature; and that if, in particular, he is subject to catarrhs, rheums, or the like complaints, the dews and cold fogs, in these early and late airings, will be apt to increase all those disorders. Nature, we see, also points out the sun-beams as of great use to these animals; those which are kept hardy and lie out all night, always running to those places where the sunshine comes, as soon as it appears in a morning. This should seem to recommend those airings that are to be made before sun-set, and a little time after sun-rise. As to the caution, so earnestly inculcated by Markham, of using these early and late airings for fat horses, it is found unnecessary by many: for they say, that the same effect may be produced by airings at warmer times, provided only that they are made longer; and that, in general, it is from long airings that we are to expect to bring a horse to a perfect wind and sound courage.

AIRY, or AERY, among sportsmen, a term expressing the nest of a hawk or eagle.

AIRY Triplicity, among astrologers, denotes the three signs, gemini, libra, and aquarius.

AISNE, a river of France, which rises in Champagne, and runs W. by Soissons in the lfe of France, falling into the river Oise, a little above Campeigne.

AITOCZU, a considerable river of Lesser Asia, which, arising in the mountain Taurus, falls into the south part of the Euxine sea.

AJUGA, BUGLE, a genus of the gymnospermia order, belonging to the didynamia class of plants. The Species enumerated by Linnæus are, 1. The orientalis, with inverted flowers, which is a native of the East. 2. The genevensis, with woolly leaves and hairy cups,

* See Hydrostatics, n° 6.

† See Pneumatics, n° 6.

Ajoga
Aix.

is a native of Swifferland and of the southern parts of Europe. 3. The pyramidalis, or mountain-bugle, with a square pyramidal spike, and blue flowers, is a native of Sweden, Germany, Swifferland, and the hilly parts of Britain. Sheep and goats eat it; cows are not fond of it; horses and swine refuse it. 4. The reptans, common, or pasture bugle, with creeping suckers, and blue, red, or white blossoms, in long leafy spikes, is a native of the southern parts of Europe, and is met with in woods and moist places in many parts of Britain. The roots are astringent, and strike a black colour with vitriol of iron.

Culture. The first species is propagated by sowing the seeds soon after they are ripe, in a pot filled with loamy earth, and placed in a shady situation till autumn; when it must be removed under a frame, and protected from the frosts. In the spring, after the plants are come up, let them be translated each into a separate pot, and in summer placed under a shady situation. The other sorts are easily propagated by their side-shoots, and succeeded best in a moist shady situation.

A I U S L O C U T I U S, the name of a deity to whom the Romans erected an altar.—The words are Latin, and signify “a speaking voice.”—The following accident gave occasion to the Romans erecting an altar to the *Aius Locutius*. One M. Ceditius, a plebeian, acquainted the tribunes, that, in walking the streets by night, he had heard a voice over the temple of Vesta, giving the Romans notice that the Gauls were coming against them. This intimation was however neglected; but after the truth was confirmed by the event, Camillus acknowledged this voice to be a new deity, and erected an altar to it under the name of the *Aius Locutius*.

A J U T A G E, or **A N J U T A G E**, a kind of tube fitted to the mouth of the vessel through which the water of a fountain is to be played. To the different form and structure of *ajutages*, is owing the great variety of fountains. See **F O U N T A I N**.

A I X, a small, but ancient town, in the duchy of Savoy, with the title of a marquissate. It is seated on the lake Bourget, at the foot of a mountain, between Chamberry, Annecy, and Rumilly. There is here a triumphal arch of the ancient Romans, but it is almost entirely ruined. The mineral waters bring a great number of strangers to this place. E. Long. 7. 10. N. Lat. 45. 40.

A I X, an ancient city, the capital of Provence, in France. It is an archiepiscopal; and has a parliament, a court of aids, a chamber of accounts, a seneschal's jurisdiction, a generality, and an university. It is a well-built city; and most like Paris of any place in the kingdom, as well for the largeness of the buildings, as in respect of the politeness of the inhabitants. It is embellished with abundance of fine fountains and several beautiful squares. The preachers square is on the side of a hill; it is about 160 yards in length, and is surrounded with trees, and houses, built with stone, three stories high. The town-hall is at one end of the city, and is distributed into several fine apartments: the two lowest are taken up by the board of accounts, and by the seneschal; that above is designed for the sessions of parliament. The hall of audience is adorned with the pictures of the kings of France on horseback. The hotel of the city is a handsome building, but hid by the houses of the narrow street in which it is placed.

The cathedral church is a Gothic structure. The church of the fathers of the oratory is a handsome building; and not far from thence is the chapel of the blue penitents, which is full of paintings. The convent of preachers is very fine; in their church is a silver statue of the Virgin Mary almost as big as the life. There are other churches and buildings which contain a great number of rarities. The baths without the city, which were discovered not long since, have good buildings, raised at a vast expence, for the accommodation of those that drink the waters. E. Long. 5. 32. N. Lat. 43. 32.

A I X, a small island on the coast of France, between the isle of Oleron and the continent. It is twelve miles north-west of Rochfort, and twelve south-fourth-west of Rochelle. W. Long. 1. 4. N. Lat. 46. 5.

A I X L A C H A P E L L E, a fine city of Germany, in the circle of Westphalia and duchy of Juliers. All authors are agreed about its antiquity, it being mentioned in Cæsar's Commentaries and the Annals of Tacitus. The Romans had colonies and fortresses there, when they were at war with the Germans; but the mineral waters and the hot bath so increased its fame, that, in process of time, it was advanced to the privileges of a city, by the name of *Aquægranii*, that is, the waters of Granus; that which it has now, of *Aix la Chapelle*, was given it by the French, to distinguish it from the other Aix. It is so called, on account of a chapel built by Charlemagne in honour of the Holy Virgin. Having repaired, beautified, and enlarged the city, that was destroyed by the Huns, in the reign of Attila, in 451, he made it the usual place of his residence. The town is seated in a valley surrounded with mountains and woods, and yet the air is very wholesome. It may be divided into the inward and outward city. The inward is compassed with a wall about three quarters of a league in circumference, having ten gates; and the outward wall, in which there are eleven gates, is about a league and a half in circumference. There are rivulets which run through the town and keep it very clean, turning several mills; besides twenty public fountains, and many private ones. They have stone-quarries in the neighbourhood, which furnish the inhabitants with proper materials for their magnificent buildings, of which the stadt-house and the cathedral are the chief. There are likewise thirty parochial or collegiate churches. The market-place is very spacious, and the houses round it stately. In the middle, before the stadt-house, is a fountain of blue stones, which throws out water, from six pipes, into a marble basin placed beneath, thirty feet in circumference. On the top of this fountain, is placed the statue of Charlemagne, of brass, gilt, holding a sceptre in his right hand, and a globe in his left. The stadt-house is adorned with the statues of all the emperors since Charlemagne. This fabric has three stories, the upper of which is one entire room, of 162 feet in length and 60 in breadth. In this the new-elected emperor formerly entertained all the electors of the empire.—*Aix la Chapelle* is a free imperial city, and changes its magistracy every year on the eve of St John Baptist. The mayor is in the nomination of the elector palatine, in the quality of the duke of Juliers, as protector of the city. This place is famous for several councils, and treaties of peace concluded here, particularly those between France and Spain in 1668, and between Great Britain

Aix la
Chapelle.

Aix la
Chapelle,
Akenide.

Britain and France in 1748. The baths have been frequented for several centuries, of which some are hot and some are warm. The principal are called the Emperor's Bath, the Bath of St Cornille, the Bath of Roses, the Bath of St Quirin, the Little Bath, and the Bath of the Poor, besides several others. The Emperor's Bath has the name of Charlemagne, who repaired it, and bathed very often in its waters; it is the finest and most commodious. The Little Bath receives its waters from the Emperor's Bath, and contains three bathing places. That of St Quirin has particular springs, but its virtues are the same as the former. The Bath of St Cornille is so called from the sign of the house where it is seated; it is only warm, and is divided into five different baths. The Bath of Roses, is so called from a citizen called John Rosen, who built it. The Poor's Bath is free for every one, and is frequented by crowds of poor people. The men bathe in distinct baths from the women, and even private baths are to be had for money. There are two springs in the lower part of the city, over one of which there is the statue of the Virgin Mary, and over the other that of Charlemagne. These are for drinking; and there are two pumps to raise up the waters. There are several galleries or piazzas, under which they walk during the time of drinking, to make them pass the more freely.—About a quarter of a league from Aix, stands the abbey of Borzet, or Burscheit, which is a very magnificent pile of building. It was formerly a monastery; but serves for a nunnery, whose abbess is a princess of the empire, and lady of Borzet. The baths here are much hotter than at Aix la Chapelle: some of them are so hot, that they will boil eggs, which is frequently done by poor people; and if you throw in a dog, he will be killed in an instant. Therefore, here, as at Aix, the water must stand till it is of a proper coolness. You may bathe here at fourteen different houses; and there is likewise one open bath where the poor may bathe gratis. Near this place are several mines of lead, coal, and lapis calamaris. The time of drinking the waters, in the first season, is from the beginning of May to the middle of June; and, in the latter season, from the middle of August to the latter end of September. They are said to be efficacious in almost all tedious chronic diseases, whether internal or of the skin, particularly in all disorders of the nerves, or in all cold diseases, and inward decays.—We need not to mention, that there are all kinds of amusements common to other places of public resort; but the sharpers appear more splendid here than elsewhere, assuming titles, with an equipage suitable to them.—Aix la Chapelle is 36 miles from Liege, and 30 from Cologne. E. Long. 5. 48. N. Lat. 51. 55.

AIZOON, called by Mr Miller *sempervire*; though the name Aizoon has been by some writers applied to the house-leek, and also to the aloes: A genus of the pentagynia order, belonging to the icofandria class of plants. Linnaeus mentions three species; the canariense, hispanicum, and paniculatum. The first is a native of the Canary islands, the second of Spain, and the third of the Cape of Good Hope. They may all be raised in this country on hot-beds; but as they are not at all remarkable either for beauty or any other property, we reckon it unnecessary to take further notice of them.

AKENSIDE (Dr Mark), a celebrated physician

and poet, born at Newcastle upon Tyne in 1721; where, and at the universities of Edinburgh and Leyden, he was educated. He was afterward admitted by mandamus to the degree of doctor in physic at Cambridge; and was appointed one of the queen's physicians, upon the establishment of her household. He was possessed of a fine luxuriant fancy; which, tho' he wrote many pieces, particularly odes, is principally displayed in that admired poem, The Pleasures of Imagination; which, however, he did not live to finish according to his plan. He died of a putrid fever in 1770.

AKIBA, a famous rabbin, flourished a little after the destruction of Jerusalem by Titus. He kept the flocks of a rich citizen of Jerusalem till the 40th year of his age, and then applied himself to study in the academies for 24 years; and was afterwards one of the greatest masters in Israel, he having 24,000 scholars. He declared for the impostor Barcochebas, whom he owned for the Messiah; and not only anointed him king, but took upon himself the office of his master of the horse. The troops which the emperor Hadrian sent against the Jews, who under the conduct of this false Messiah had committed horrid massacres, exterminated this faction. Akiba was taken, and put to death with great cruelty. He lived 120 years; and was buried with his wife in a cave upon a mountain not far from Tiberias, and his 24,000 scholars were buried round about him upon the same mountain. It is imagined he invented a supposititious work under the name of the patriarch Abraham.

AKISSAT, the ancient Thyatira, a city in Nattolia, in Asia, situated in a plain 18 miles broad, which produces plenty of cotton and grain. The inhabitants, who are reckoned to be about 5000, are said to be all Mahometans, and not one Christian among them, except a few slaves. The houses are built of nothing but earth or turf dried in the sun, and are very low and ill contrived; but there are six or seven mosques, which are all of marble. There are remarkable inscriptions on marble in several parts of the town, which are part of the ruins of ancient Thyatira. It is seated on the river Hermus, 50 miles from Pergamos. E. Long. 28. 30. N. Lat. 38. 50.

AKOND, in the Persian affairs, the chief judge in all cases of contracts and other civil matters. He is at the head of the lawyers, and has his deputies in all courts of the kingdom.

AL, an Arabic particle prefixed to words, and signifying much the same with the English particle *the*: Thus they say, alkermes, alkoran, &c. *i. e.* the kermes, the koran, &c.

AL, or ALD, a Saxon term frequently prefixed to the names of places, denoting their antiquity; as Aldborough, Aldgate, &c.

ALA, a Latin term properly signifying a wing; from a resemblance to which several other things are called by the same name: Thus,

ALA, is a term used by botanists for the hollow of a stalk, which either the leaf, or the pedicle of the leaf, makes with it; or it is that hollow turning, or sinus, placed between the stalk or branch of a plant, and the leaf, whence a new offspring usually issues. Sometimes it is used for those parts of leaves otherwise called *lobes*, or *wings*.

ALÆ,

Akiba
||
Als.

Alæ
||
Aladinista.

ALÆ (the plural number) is used to signify those petals or leaves of papilionaceous flowers, placed between those others which are called the vexillum and carina, and which make the top and bottom of the flowers. Instances of flowers of this structure are seen in those of pease and beans, in which the top leaf or petal is the vexillum, the bottom the carina, and the side ones the alæ. See **PAPILIONACEOUS**.

ALÆ is also used for those extremely slender and membranaceous parts of some seeds, which appear as wings placed on them; it likewise signifies those membranaceous expansions running along the stems of some plants, which are therefore called alated stalks.

ALÆ, in anatomy, a term applied to the lobes of the liver, the cartilages of the nostril, &c.

ALÆ, in the Roman art of war, were the two wings or extreme parts of the army drawn up in order of battle.

ALABA, one of the three smallest districts of Biscay in Spain, but pretty fertile in rye, barley, and fruits. There are in it very good mines of iron, and it had formerly the title of a kingdom.

ALABARCHA, in antiquity, a kind of magistrature among the Jews of Alexandria, whom the emperors allowed them to elect, for the superintendency of their policy, and to decide differences and disputes which arose among them.

ALABASTER, in natural history, a genus of fossils resembling marble, which are bright, brittle, and do not give fire with steel; they ferment with acids, and readily calcine with heat. There are three species of alabaster. 1. The snow-white shining alabaster, or lydium of the ancients, is found in Taurus, in pieces large enough to make dishes, or the like. It cuts very freely, and is capable of a fine polish. 2. The yellowish alabaster, or phengites of Pliny, is found in Greece; and is of a soft loose open texture, pretty heavy, and nearly of the colour of honey. This species has likewise been found in Germany, France, and in Derbyshire in England. 3. Variegated, yellow, and reddish alabaster. This species is the common alabaster of the ancients, and is so soft that it may be cut with a knife: It is remarkably bright, and almost transparent; admits of a fine polish and consists of large angular sparry concretions. It is not proof against water; it ferments violently with aqua-fortis, and burns to a pale yellow. The colour of this species is a clear pale yellow resembling amber, and variegated with undulated veins; some of which are pale red, others whitish, and others of a pale brown. It was formerly brought from Egypt, but is now to be met with in several parts of England. The alabasters are frequently used by statuary for small statues, vases, and columns. After being calcined and mixed with water, they may be cast in any mould like plaster of Paris. See **GYPsum**.

ALABASTER, in antiquity, a term not only used for a box of precious ointment; but also for a liquid measure, containing ten ounces of wine, or nine of oil.

ALABASTRUM DENDROIDE, a kind of laminated alabaster, beautifully variegated with the figures of shrubs, trees, &c. found in great abundance in the province of Hohenstein.

ALADINISTS, a sect among the Mahometans, answering to free-thinkers among us.

VOL. I.

Aladulia
||
Aladinista.

ALADULIA, a considerable province of Turkey in Asia, in that part called Natolia, between the mountains of Antitaurus, which separate it from Amasia on the north, and from Carmania on the west. It has the Mediterranean sea on the south; and the Euphrates, or Frat, on the east, which divides it from Diarbeker. It comprehends the Lesser Armenia of the ancients, and the east part of Cilicia. Formerly it had kings of its own; but the head of the last king was cut off by Selim I. emperor of the Turks, who had conquered the country. It is now divided into two parts: the north, comprehended between Taurus, Antitaurus, and the Euphrates, is a beglerbeglic, which bears the name of Marash, the capital town; and the south, seated between mount Taurus and the Mediterranean, is united to the beglerbeglic of Aleppo. The country is rough, ragged, and mountainous; yet there are good pastures, and plenty of horses and camels. The people are hardy and thievish. The capital is Malatiah.

ALAIN (Chartier), secretary to Charles VII. king of France, born in the year 1386. He was the author of several works in prose and verse; but his most famous performance was his Chronicle of King Charles VII. Bernard de Girard, in his preface to the History of France, styles him "an excellent historian, who has given an account of all the affairs, particulars, ceremonies, speeches, answers, and circumstances, at which he was present himself, or had information of." Giles Coroxet tells us, that Margaret, daughter to the king of Scotland, and wife to the dauphin, passing once through a hall where Alain lay asleep, she stopped and kissed him before all the company who attended: some of them telling her, that it was strange she should kiss a man who had so few charms in his person, she replied, "I did not kiss the man, but the mouth from whence proceed so many excellent sayings, so many wise discourses, and so many elegant expressions." Mr Fontenelle, among his Dialogues of the Dead, has one upon this incident, between the princess Margaret and Plato. Mr Pasquier compares Alain to Seneca, on account of the great number of beautiful sentences interspersed throughout his writings.

ALAIS, a considerable town of France, in the province of Languedoc, situated on the river Gardon, at the foot of the Cevennes. The Jesuits had a college in this place; and a fort was built here in 1689. It is 34 miles north of Montpellier, and 340 from Paris. E. Lon. 4. 20. N. Lat. 44. 8.

ALALCOMENIUS, in Grecian antiquity, the Boeotian name of the month called, by the Athenians, *MamaGerion*.

ALAMANNI (Lewis) was born at Florence, of a noble family, on the 28th of October, 1495. He was obliged to fly his country for a conspiracy against Julius de Medici, who was soon after chosen pope under the name of Clement VII. During this voluntary banishment, he went into France; where Francis I. from a love to his genius and merit, became his patron. This prince employed him in several important affairs, and honoured him with the collar of the order of St. Michael. About the year 1540, he was admitted a member of the Inflammati, an academy newly erected at Padua, chiefly by Daniel Barbaro and Ugolin Martelli. After the death of Francis, Henry duke of Orleans, who succeeded him in 1537, shewed no less fa-

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vour

Alamodality
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Alan.

vour to Alamanni; and in the year 1551, sent him as his ambassador to Genoa: this was his last journey to Italy; and being returned to France, he died at Amboise on the 18th of April 1556, being in the 61st year of his age. He left many beautiful poems, and other valuable performances, in the Italian language. We have also some notes of his upon Homer's Iliad and Odyssey; those upon the Iliad were printed in the Cambridge edition of Homer in 1689, and Joshua Barnes has also inserted them in his fine edition of Homer in 1711.

ALAMODALITY, in a general sense, is the accommodating a person's behaviour, dress, and actions, to the prevailing taste of the country or times in which he lives.

ALAMODALITY of writing, is defined the accommodation of mental productions, both as to the choice of subject and the manner of treating it, to the genius or taste of the times, in order to render them more acceptable to the readers.

ALAMODE, a phrase originally French, importing a thing to be in the fashion or mode. The phrase has been adopted not only into several of the living languages, as the English and High-Dutch, but some have even taken it into the Latin. Hence we meet with *Alamodicus* and *Alamodalitas*.

ALAMODE, in commerce, a thin glossy black silk, chiefly used for womens hoods and mens mourning scarfs.

ALAN (Cardinal William), was born at Rossal in Lancashire, in the year 1532. He went to Oxford at the age of 15, and in 1550 was elected fellow of Oriel college. In 1556, being then only 24 years old, he was chosen principal of St Mary's hall, and one of the proctors of the university. In 1558 he was made canon of York; but, upon queen Elizabeth's accession to the throne, he left England, and settled at Louvain in an English college, of which he became the chief support. In 1565 he visited his native country; but, on account of his extreme activity in the propagation of the Roman-catholic religion, he was obliged to fly the kingdom in 1568. He went first to Mechlin; and then to Doway, where he was made doctor of divinity. Soon after, he was appointed canon of Cambrai, and then canon of Rheims. He was created cardinal on the 28th of July, 1587, by the title of *St Martin in Montibus*; and obtained from the king of Spain a rich abbey in the kingdom of Naples, and afterwards the bishoprick of Mechlin. It is supposed to have been by the advice and instigation of this priest, that Philip II. attempted to invade England. He died on the 20th of October 1594, aged 63; and was buried in the English college at Rome. He was a man of considerable learning, and an elegant writer. He wrote many books in defence of the Romish religion. The most remarkable are, 1. *A defence of the 12 martyrs in one year*. Tho. Alfeld was hanged for bringing, and publishing, this and other of Alan's works, into England, in the year 1584. 2. *A declaration of the sentence of Sextus V.* &c. A work intended to explain the pope's bull for the excommunication of queen Elizabeth, and to exhort the people of England to take up arms in favour of the Spaniards. Many thousand copies of this book, printed at Antwerp, were put on board the Armada; but the enterprize failing,

they were afterwards destroyed. 3. *Of the worship due to saints and their relics*, 1583. This treatise was answered by lord Burleigh, and is esteemed the most elegant of the cardinal's writings.

ALAND, an island of the Baltic sea, between Sweden and Finland, subject to the former. It lies between 17 and 19 degrees of E. Long. and between 59 and 61 degrees of Lat. at the entrance of the gulph of Bothnia.

ALANORARIUS, in our old customs, was a keeper of spaniels, setting-dogs, &c. for the use of sportsmen. The word is derived from *alan*, a gothic term for a grey-hound.

ALAUQUECA, a stone brought from the East Indies in small glossy fragments, said to stop hæmorrhages by external application.

ALARAF, in the Mahometan theology, the partition wall that separates heaven from hell. The word is plural, and properly written *al araf*; in the singular it is written *al arf*. It is derived from the Arabic verb *arafa*, to distinguish. Al araf gives the denomination to the seventh chapter of the alcoran, wherein mention is made of this wall. Mahomet seems to have copied his al araf, either from the great gulf of separation mentioned in the New Testament, or from the Jewish writers, who also speak of a thin wall dividing heaven from hell. Mahometan writers differ extremely as to the persons who are to be found on al araf. Some take it for a sort of limbus for the patriarchs, prophets, &c. others place here such whose good and evil works so exactly balance each other, that they deserve neither reward nor punishment. Others imagine this intermediate space to be possessed by those who, going to war without their parents leave, and suffering martyrdom there, are excluded paradise for their disobedience, yet escape hell because they are martyrs.

ALARBES, or ALARABES, a name given to those Arabians who live in tents, and distinguish themselves by their dress from the others who live in towns.

ALARES, in Roman antiquity, an epithet given to the cavalry, on account of their being placed in the two wings of the army.

ALARM, in the military art, denotes either the apprehension of being suddenly attacked; or the notice thereof, signified by firing a cannon, firelock, or the like.—False alarms are frequently made use of to harass the enemy, by keeping them constantly under arms. Sometimes also this method is taken to try the vigilance of the picket-guard, and what might be expected from them in case of real danger.

ALARM-Bell, that rung upon any sudden emergency, as a fire, mutiny, or the like.

ALARM-Post, or ALARM-place, the ground for drawing up each regiment in case of an alarm. This is otherwise called the rendezvous.

ALARM, in fencing, is the same with what is otherwise called an appeal, or challenge.

ALASANI, in church-history, a sect of Antilutherans, whose distinguishing tenet, besides their denying baptism, is said to have been this, that the words, *This is my body*, in the institution of the eucharist, are not to be understood of the bread, but of the whole action, or celebration of the supper. They are said to have taken the name from one Joannes a Lasco, a Polish baron, superintendent of the church of that country.

Aland
||
Alafcani.

Alafco
||
Alauda.

in England. See the next article.

ALASCO (John), a Polish nobleman of the 16th century, who, imbibing the reformed opinions, was expelled his country, and became preacher to a Protestant congregation at Embden; but foreseeing persecution there, came to England about the year 1551, while the reformation was carrying on under Edward the VI. The publication of the Interim driving the Protestants to such places as afforded them toleration, 380 were naturalized here, and obtained a charter of incorporation, by which they were erected into an ecclesiastical establishment, independent on the church of England. The Augustine friars church was granted them, with the revenues, for the maintenance of Alafco as superintendent, with four assistant ministers, who were to be approved by the king: and this congregation lived undisturbed until the accession of Queen Mary, when they were all sent away. They were kindly received and permitted to settle at Embden; and Alafco at last, after an absence of twenty years, by the favour of Sigismund returned to his own country, where he died in 1560. Alafco was much esteemed by Erasmus, and the historians of his time speak greatly in his praise: we have of his writing, *De Cena Domini liber; Epistola continens summam Controversie de Cena Domini, &c.* He had some particular tenets; and his followers are called *Alafcani* in church-history. See the preceding article.

ALATAMAHA, a large river of North America, which, rising in the Apalachian mountains, runs south-east through the province of Georgia, and falls into the Atlantic ocean, below the town of Frederica.

ALATED ANIMALS, such as are furnished with wings.

ALATED *Leaves*, in botany, such as are composed of several pinnated ones. See PINNATED.

ALATERNOIDES, in botany, a synonyme of a species of the myrica. See MYRICA.

ALATERNUS, in botany, the trivial name of a species of the rhamnus. See RHAMNUS.

ALAVA, a district of Spain, about 20 miles in length, and 17 in breadth, containing very good iron mines. Victoria is the capital town.

ALAUDA, or LARK, in ornithology, a genus of birds of the order of passerines; the characters of which are these: The beak is cylindrical, subulated, straight; and the two mandibles or chaps are of equal size. The tongue is bifid, and the hinder claw is straight, and longer than the toe. There are nine species of the alauda. 1. The arvensis, or common sky-lark. This and the wood-lark are the only birds that sing as they fly; this raising its note as it soars, and lowering it till it quite dies away as it descends. It will often soar to such a height, that we are charmed with the music when we lose sight of the songster; it also begins its song before the earliest dawn. Milton, in his *Allegro*, most beautifully expresses these circumstances; and bishop Newton observes, that the beautiful scene that Milton exhibits of rural cheerfulness, at the same time gives us a fine picture of the regularity of his life, and the innocence of his own mind: thus he describes himself as in a situation

To hear the lark begin his flight,
And singing sparkle the dull night,
From his watch-tow'r in the skies,
Till the dappled dawn doth rise.

It continues its harmony several months, beginning early in the spring, on pairing. In the winter they assemble in vast flocks, grow very fat, and are taken in great numbers for our tables. They build their nest on the ground, beneath some clod, forming it of hay, dry fibres, &c. and lay four or five eggs.—The place these birds are taken in the greatest quantity, is the neighbourhood of Dunstable: the season begins about the 14th of September, and ends the 25th of February; and during that space, about 4000 dozen are caught, which supply the markets of the metropolis. Those caught in the day are taken in clap-nets of fifteen yards length, and two and a half in breadth; and are enticed within their reach by means of bits of looking-glass, fixed in a piece of wood, and placed in the middle of the nets, which are put in a quick whirling motion by a string the larker commands; he also makes use of a decoy-lark. These nets are used only till the 14th November: for the larks will not *dare*, or frolic in the air, except in fine sunny weather; and of course cannot be inveigled into the snare. When the weather grows gloomy, the larker changes his engine, and makes use of a trammel net, twenty-seven or twenty-eight feet long, and five broad; which is put on two poles, eighteen feet long, and carried by men under each arm, who pass over the fields and quarter the ground as a setting dog: when they hear or feel a lark hit the net, they drop it down, and so the birds are taken.—2. The pratensis, or tit-lark, has the two outward feathers of the wing edged with white, and frequents the meadows. It is found frequently in low marshy grounds: like other larks, it builds its nest among the grass, and lays five or six eggs. Like the wood-lark, it sits on trees; and has a most remarkable fine note, singing in all situations, on trees, on the ground, while it is sporting in the air, and particularly in its descent. This bird, with many others, such as the thrush, blackbird, willow-wren, &c. become silent about midsummer, and resume their notes in September: hence the interval is the most mute of the year's three vocal seasons, spring, summer, and autumn. Perhaps the birds are induced to sing again as the autumnal temperance resembles the vernal.—3. The arborea, or wood-lark, is a native of Europe, and is distinguished by an annular white fillet about the head. It is inferior in size to the sky-lark, and is of a shorter thicker form; the colours are paler, and its note is less sonorous and less varied, though not less sweet. It perches on trees, and whistles like the black-bird. It will sing in the night; and, like the common lark, will sing as it flies. It builds on the ground, and makes its nest on the outside with moss, within of dried bents, lined with a few hairs. It lays five eggs, dusky and blotched with deep brown marks, darkest at the thicker end. The males of this and the last are known from the females by their superior size. But this species is not near so numerous as that of the common kind.—4. The campestris, has one half of its chief feathers of the wings brown, except two in the middle which are white, and the throat and breast are yellowish.—5. The trivialis, whose chief feathers on the tail are brown, only half of the outermost is white, and the second is white at the end, in the shape of a wedge; there is likewise a double whitish line on the wings. It is a native of Sweden, and perches on the tops of trees.—6. The cristata: the chief

Alauda,
or lark.

Tit-lark.

Wood-lark,
&c.

Sky-lark,
Pl. III, fig. 8.

many years since, a tomb was discovered in this church, said to be that of Humphrey duke of Gloucester: when the leaden coffin was opened, the body was pretty entire, being preserved in a sort of pickle. There was a stately cross in the middle of the town, as there were in many other places where queen Eleanor's body rested when it was brought out of the north for interment at Westminster; but it has been demolished, as some say, by the inhabitants. The market-days are Wednesdays and Saturdays. W. Long. o. 12. N. Lat. 51. 44.

ALBANUS MONS, (anc. geog.) now called *Mont Albano*, 16 miles from Rome, near where Alba Longa stood.

ALBANUS MONS, (anc. geog.) to the north of Itria, called *Albius* by Strabo; the extremity of the Alps, which, together with the mountains to the east, joining it, called *Montes Bebi*, separates the farther Liburnia and Dalmatia from Pannonia.

ALBA REGALIS. See *STUL WEISSENBURGH*.

ALBANY, a fortress belonging to the British, seated on the S. W. of Hudson's bay. W. long. 84. 20. N. lat. 53. 20.

ALBANY, a town of North America, the capital of one of the ten counties of the province of New-York, which goes by the same name, is a well built place, considering the country. Here the sachems, or the kings of the Five Nations of Iroquois, met the governors of the British plantations, when they entered into any treaty with them. W. Long. 44. 29. N. Lat. 42. 30.

ALBARAZIN, a strong town, and one of the most ancient of the kingdom of Arragon in Spain. It is seated upon an eminence, near the river Guadaluquivir, a little below its source, and on the frontiers of Valencia and New Castile. It is the seat of a bishop, and produces the best wool in all Arragon. It is about 100 miles east of Madrid. E. Long. 2. 10. N. Lat. 40. 32.

ALBARII, in antiquity, properly denoted those who gave the whitening to earthen vessels, &c. In which sense they stood contradistinguished from *Dealbatores*, who whitened walls.

ALBARIUM OPUS, in the ancient building, the incrustation or covering of the roofs of houses with white plaster, made of mere lime. This is otherwise called *opus album*. It differs from *Tectorium*, which is a common name given to all roofing or ceiling, including even that formed of lime and sand, or lime and marble; whereas *Albarium* was restrained to that made of lime alone.

ALBATI EQUI, an appellation given to such horses, in the games of the ancient circus, as wore white furniture, in contradistinction from the *Venetii*, *Prasini*, and *Rufetti*. See *VENETI*, *PRASINI*, &c.

ALBATROSS, in ornithology, a species of the diomedea. See *DIOMEDEA*.

ALBAZIN, a town of Greater Tartary, with a strong castle: It is situated upon the river Amur, or Yamour, and belongs to the Muscovites. E. long. 103. 30. N. lat. 54. o.

ALBE, a small piece of money, current in Germany, worth only a French fol and seven deniers.

ALBEMARLE, or **AUMARLE**, a town of France, in Upper Normandy, and in the territory of Caux, from whence the noble family of Keppel takes the title

of *Earl*. The ferges of this town are in high esteem. It is seated on the declivity of a hill, on the confines of Picardy, 35 miles N. E. of Rouen, and 70 N. W. of Paris. E. Long. 2. 21. N. Lat. 49. 50.

ALBEMARLE, the most northern part of the province of North Carolina, in America.

ALBENGUA, a town of Italy, in the territory of Genoa. It is the see of a bishop; and is a very ancient handsome town, but not well peopled on account of the insalubrity of the air. However, it is seated in a very beautiful plain, which is well cultivated; and the outside of the town is surrounded with olive-trees. It is a seaport, about 38 miles S. W. of Genoa. E. Long. 8. 13. N. Lat. 44. 4.

ALBERONI (Julius), the son of a poor gardener, in the suburbs of Placentia, born in 1664; who, by his great abilities and good fortune, rose from this low original, to the employment of first minister of state at the court of Spain, and to the dignity of cardinal. He roused that kingdom out of the lethargy it had sunk into for a century past; awakened the attention, and raised the astonishment, of all Europe, by his projects; one of which was to set the Pretender on the throne of Great Britain. He was at length deprived of his employment, and banished to Rome: he died in 1752, at the great age of 89. His *Testament Politique*, collected from his memoirs and letters, was published at Laufanne in 1753.

ALBERTI (Leone Battista), was descended from a noble family in Florence; and was perfectly acquainted with painting, sculpture, and architecture. He wrote of all three in Latin; but his studies did not permit him to leave any thing considerable behind him in painting. He was employed by Pope Nicholas V. in his buildings, which he executed in a beautiful manner; and his work on architecture, which consists of ten books, is greatly esteemed. He also wrote some treatises of morality, and a piece on arithmetic. He died in 1485.

ALBERTUS (Magnus), a Dominican friar, and afterwards archbishop of Ratisbon, was one of the most learned men and most famous doctors of the 13th century. He was by the ignorant charged with being a magician, and making a machine resembling a man, which they foolishly imagined explained all the difficulties he proposed to it. He died at Cologne, November 15. 1280. His works were printed at Lyons, in 1651, in 21 volumes in folio.

ALBERTUS, a gold coin, worth about 14 French livres: it was coined during the administration of Albertus archduke of Austria.

ALBESIA, in antiquity, a kind of shields otherwise called *Decumana*. See *DECUMANA*.

ALBI, a city of France, the capital of the Albigeois, in Languedoc, and the see of an archbishop. The cathedral is dedicated to St Cecilia, and has one of the finest choirs in the kingdom. Here is a very valuable silver shrine, of exquisite workmanship, of the Mosaic kind: it contains the reliques of St Clair, the first bishop of this city. The chapel of this pretended saint is magnificent, and adorned with paintings. The Lice is a fine large walk without the city: what distinguishes this from all others, is a terras above a deep mall, which serves instead of a fosse; it is bordered with two rows of very fine trees, which are kept in excellent order.

Albigenses.

order. There are four gates, through which you may view all the beauties of a delightful plain. At one end of this is the convent of the Dominicans. The archbishop's palace is very beautiful. The river washes its walls, and serves both for an ornament and defence. This city is seated on the river Tarn, 35 miles north-by-west of Toulouse, and 250 south of Paris. E. Long. o. 52. N. Lat. 43. 56.

The Albigeois is a small territory about 27 miles in length, and 20 in breadth, abounding in corn, woad, grapes, saffron, plums, and sheep; and the inhabitants drive a great trade in dried prunes, grapes, a coarse sort of cloth, and wines of Gaillac. These wines are the only sorts hereabouts that are fit for exportation: they are carried down to Bourdeaux, and generally sold to the British. They have likewise several coal-mines.

ALBIGENSES, in church-history, a sect or party of reformers, about Toulouse and the Albigeois in Languedoc, who sprung up in the 12th century, and distinguished themselves by their opposition to the discipline and ceremonies of the Romish church.

This sect had their name, it is supposed, either by reason there were great numbers of them in the diocese of Albi, or because they were condemned by a council held in that city. In effect, it does not appear that they were known by this name, before the holding of that council. The *Albigenses* were also called *Albians*, *Albigesii*, *Albii*, and *Albanenses*, though some distinguish these last from them. Other names given to them are, *Henricians*, *Abelardists*, *Bulgarians*, &c. some on account of the qualities they assumed; others on that of the country from whence it is pretended they were derived; and others on account of persons of note who adopted their cause, as Peter de Brius, Arnold de Bresse, Abelard, Henry, &c. Berengarius, if not Wickliff himself, is by some ranked in the number. The *Albigenses* are frequently confounded with the *Waldenses*; from whom, however, they differ in many respects, both as being prior to them in point of time, as having their origin in a different country, and as being charged with divers heresies, particularly Manicheism, from which the *Waldenses* are exempt. But several Protestant writers have vindicated them from that imputation. Dr Allix shews, that a great number of *Manichees* did spread over the western countries from Bulgaria; and settled in Italy, Languedoc, and other places, where there were also *Albigenses*; by which means, being both under the imputation of *heresy*, they came, either by ignorance or malice, to be confounded, and called by the same common name, tho' in reality entirely different.

Other errors imputed to them by their opponents, the monks of those days, were, That they admitted two Christs; one evil, who appeared on earth; the other good, who has not yet appeared: That they denied the resurrection of the body; and maintained human souls to be demons imprisoned in our bodies, by way of punishment for their sins: That they condemned all the sacraments of the church; rejected baptism as useless; held the eucharist in abhorrence; excluded the use of confessions and penance; maintained marriage unlawful; laughed at purgatory, prayers for the dead, images, crucifixes, &c.—There were likewise said to be two classes of them; the Perfect, and the Believers. The perfect boasted of their living in continence, of eating

neither flesh, eggs, nor cheese. The believers lived like other men, and were even loose in their morals; but they were persuaded they should be saved by the faith of the perfect, and that none were damned who received imposition of hands from them. But from these charges also they are generally acquitted by Protestants; who consider them as the pious inventions of the Romish church, whose members deem it meritorious by any means to blacken heretics.

However this be, the Albigenes grew so formidable, that the Catholics agreed upon a holy league or crusade against them. They were at first supported by Raimond, count of Toulouse. Pope Innocent III. desirous to put a stop to their progress, sent a legate into their country; which failing, he stirred up Philip Augustus, king of France, and the other princes and great men of the kingdom, to make war upon them. Upon this the count of Toulouse, who had sided with them, made his submission to the pope, and went over to the Catholics: but soon after, finding himself plundered by the crusaders, he declared war against them, and was joined by the king of Aragon. His army was defeated at the siege of Muret, where he himself was killed, and the defeat followed by the surrender of the city of Toulouse, and the conquest of the greatest part of Languedoc and Provence. His son Raimond succeeded him; who agreed with the king and the pope to set up the inquisition in his estates, and to extirpate the Albigenes. In an assembly held at Milan, the archbishop of Toulouse drew up articles; agreeable to which the count made a most ample declaration against them, which he published at Toulouse in 1253. From this time the Albigenes dwindled by little and little, till the times of the reformation; when such of them as were left fell in with the Vaudois*, and became conformable to the doctrine of Zuinglius and the discipline of Geneva.

The curious reader who desires to know more concerning the history of the *Albigenses*, may consult *Prætor. Elench. Hæc.*—For the persecutions, wars, and crusades raised against them, see *Limborch. Hist. Inquisit. l. i. c. 8. seq. Act. Erud. Lipf. 1693. p. 324. seq. Kuyser, Bibl. Nov. Libr. T. 3. p. 33. Du Pin, Bibl. Eccles. T. 10. p. 166. Jour. des Scav. T. 26. p. 109. T. 28. p. 481. Bibl. Choif. T. 27. p. 42. Holy Inquis. c. 3. sect. 1. p. 51. Ouvr. des Scav. Jan. 1694. p. 238.—The lawfulness of persecuting them, Jour. des Scav. T. 13. p. 105.—Colloquies and councils against them, *Allix, Rem. Hist. Albigen. c. 15. seq. Act. Erud. Lipf. 1693. p. 173.*—Their Manicheism refuted, *Allix, ubi supra, c. 11. Act. Erud. Lipf. an. 1693. p. 171. Allix, Rem. Hist. Piedm. c. 15. Act. Erud. Lipf. 1691. p. 261. Basnage, Hist. de la Relig. c. 4. & 5. Act. Erud. Lipf. 1690. p. 399. Ouvr. des Scav. Jan. 1690. p. 221. seq. Bibl. Choif. T. 27. p. 44.—Their merits as reformers, *Act. Erud. Lipf. 1693. p. 173. seq. Mem. de Trev. 1717. p. 1375. Bibl. Univ. T. 9. p. 33. As saints and martyrs, Hist. Crit. Rep. Lett. T. 4. p. 19. Jour. des Scav. T. 35. p. 385.***

ALBIGENSES is also a name sometimes given to the followers of Peter Vaud, or Waldo; and hence synonymous with what we more properly call *Waldenses*, or Poor Men of Lyons. In this sense the word is applied by Camerarius, Thuanus, and several other writers. The reason seems to be, that the two parties

* See *Vau-
dois.*

Albintemelium
||
Alborak.

parties agreed in their opposition to the papal innovations and encroachments, though in divers other respects said to be different enough. The bishop of Meaux labours hard to support a distinction between the two sects, alleging that the *Albigenses* were heretics and Manichees; whereas the *Waldenses* were only schismatics, not heretics; being found as to articles of faith, and only separating from the church of Rome on account of ceremonies and discipline. Dr Allix endeavours to set aside the distinction; and shews, that both of them held the same opinions; and were equally condemned and held for heretics: and this not for points of faith, but for declaiming against the papal tyranny and idolatry, and holding the pope to be the Antichrist; which last, according to M. de Meaux, constitutes nothing less than Manicheism. In this sense the Lollards and Wickliffites in England were not only Albigenes, but Manichees.

ALBINTEMELIUM, ALBINTIMILIUM, (Tacitus;) or at full length, ALBIUM INTEMELIUM, (Pliny, Strabo); now *Vintimiglia*, situated in the south-west of the territory of Genoa, near the borders of the county of Nice, with a port on the Mediterranean, at the mouth of the rivulet Rotta, almost about half-way between Monaco and S. Remo. E. Long. 7. 40. Lat. 43. 17.

ALBIOECE, or ALBECE, (Pliny, Strabo;) otherwise called *Reii Apollinares*, from their superstitious worship of Apollo; also *Civitas Reiensium*; now *Riez*, in Provence, about 18 leagues to the north-east of Toulon, on the north side of the rivulet Verdon; was originally a Roman colony, (Inscription.) It is sometimes written *Regium*. The people were called *Albici*, (Cæsar.) E. Long. 1. 0. Lat. 43. 20.

ALBINI, in antiquity, the workmen employed in what was called *Opus Albarium*. They made a different profession from the *dealatores* or *rubiteneri*.

ALBINOS, the name by which the Portuguese call the white Moors, who are looked upon by the negroes as monsters. They are the issue of a white man and black woman, and at a distance might be taken for Europeans; but, when you come near them, their white colour appears like that of persons affected with a leprosy.

ALBINOVANUS, a Latin poet, whom Ovid surnamed the *Divino*. There is now nothing of his extant, except an Elegy on Drusus, and another on the death of Mæcenas.

ALBION, the ancient name of Britain*.

New Albion, a name given by Sir Francis Drake to California.

ALBISOLA, a small town belonging to the republic of Genoa: here is a porcelain manufacture, and several country-houses of the Genoese nobility. It was bombarded in 1745, by the English. E. Long. 8. 20. N. Lat. 44. 15.

ALBOGALERUS, in Roman antiquity, a white cap worn by the *flamen dialis*, on the top of which was an ornament of olive branches.

ALBORAK, amongst the Mahometan writers, the beast on which Mahomet rode, in his journeys to heaven. The Arab commentators give many fables concerning this extraordinary vehicle. It is represented as of an intermediate shape and size between an ass and a mule. A place, it seems, was secured for it in pa-

radise, at the intercession of Mahomet; which, however, was in some measure extorted from the prophet, by Alborak's refusing to let him mount him when the angel Gabriel was come to conduct him to heaven.

ALBOURG, a town of Denmark, in North Jutland, capital of the diocese of the same name, and a bishop's see. It has this name, which signifies *cel-town*, on account of the great number of cels taken here. It is seated on a canal, 10 miles from the sea, 30 north of Wiburg, and 50 north of Arhuys. It has an exchange for merchants, and a safe and deep harbour. They have a considerable trade in herrings and corn; and a manufactory of guns, pistols, saddles, and gloves. E. Long. 29. 16. N. Lat. 56. 35.

ALBRICIUS, born at London, was a great philosopher, a learned and able physician, and well versed in all the branches of polite literature. He lived in the 11th century, and wrote several works in Latin, particularly, 1. Of the origin of the gods. 2. The virtues of the ancients. 3. The nature of poison, &c.

ALBUCA, *BASTARD STAR-OF-BETHELEHEM*, a genus of the monogynia order, belonging to the hexandria class of plants. Of this genus Linnæus reckons only two

Species. 1. The major, or star-flower, with spear-shaped leaves. This is a native of Canada, and some other parts of North America: the root is bulbous; from whence shoot up eight or ten long, narrow, spear-shaped leaves. In the center of these arises a flower-stem, a foot or more in height, garnished with a loose spike of greenish yellow flowers. After the flowers are past, the germen swells to a three-cornered capsule, having three cells filled with flat seeds. 2. The minor, or African star-flower, is a native of the Cape of Good Hope. This hath also a pretty large bulbous root, from which arise four or five narrow awl-shaped leaves, of a deep green colour; the flower-stem, which comes from the center of the root, is naked, and rarely rises more than eight or nine inches high, having five or six greenish-yellow flowers, growing almost in the form of an umbel at top: these are rarely succeeded by seeds in Britain.

Culture. The Canada albuca is hardy; so the roots may be planted about four inches deep in a border of light earth, where they will thrive, and produce their flowers late in the summer: but as the seeds do not often ripen in Britain, and the bulbs put out few off-sets, the plants are not common in this country. The African fort generally flowers twice a-year; first in March or April, and again in July or August; and if its roots are kept in pots filled with light earth, sheltered under a hot-bed frame, they will flower even in winter; but the best method is to have a border in the front of a green-house, or stove, where the roots of most of the bulbous flowers may be planted in the full ground, and screened in winter from frost: in such situations they thrive much better, and flower stronger, than when kept in pots.

ALBUGINEA *TUNICA*, in anatomy, the third or innermost coat or covering of the testes; it is likewise the name given to one of the coats of the eye.

ALBUGINEUS, in anatomy, a term sometimes applied to the aqueous humour of the eye.

ALBUGO, or *LEUCOMA*, in medicine, a distemper occasioned by a white opaque spot growing on the *cornea*

Alborg
||
Albugo.

* See the article Britain.

Album
||
Albuquerque.
* See Medicine, under
no 191.

nea of the eye, and obstructing vision*.

ALBUM, in antiquity, a kind of white table, or register, wherein the names of certain magnifices, public transactions, &c. were entered. Of these there were various forts; as the *album decurionum*, *album senatorum*, *album judicum*, *album pratoris*, &c.

ALBUM Decurionum, was the register wherein the names of the *decuriones* were entered. This is otherwise called *matriculatio decurionum*.

ALBUM Senatorum, the list of senators names, which was first introduced by Augustus, and renewed yearly.

ALBUM Judicum, that wherein the names of the persons of those *decurie* who judged at certain times, were entered.

ALBUM Pratoris, that wherein the *formule* of all actions, and the names of such judges as the prator had chosen to decide causes, were written.

The high-priest entered the chief transactions of each year into an *album*, or table, which was hung up in his house for the public use.

ALBUM Græcum, among physicians, the white dung of dogs, formerly prescribed for inflammations of the throat, &c. but now justly despised.

ALBUMAZAR, a learned Arabian astronomer in the tenth century, who wrote a treatise, *Of the Revolution of the Years*.

ALBUMEN, the white of an egg. For its nature, origin, and office, see Egg.

The white of an egg, according to Boerhaave, makes an extraordinary menstruum. Being boiled hard in the shell, and afterwards suspended in the air by a thread, it resolves and drops down into an insipid, scentless liquor, which appears to be that anomalous unaccountable menstruum so much used by Paracelsus; and will, though it contain nothing sharp, oleaginous, or saponeous, make a thorough solution of myrrh; which is more than either water, oil, spirits, or even fire itself, can effect.

A little putrid white of egg taken into the stomach, occasions a nausea, horror, fainting, vomiting, diarrhoea, and gripes; it inflames the bile, excites heat, thirst, fever; and dissolves the humours like the plague. On the contrary, the white of fresh-laid eggs, if taken while warm from the hen, is extremely nourishing to the infirm: it may be taken in luke-warm milk; but if any other heat is applied to it, the nutritious quality will be destroyed. The fresh white of egg prevents burns from rising in blisters, if it is used immediately after the accident: it mitigates inflammations of the eyes, and preserves the face from sun-burning. In pharmacy, it is used as a medium to render balsams and turpentine, &c. miscible with aqueous fluids; but as it disagrees with many stomachs when thus taken, a mucilage of gum arabic may supply its place, it being as good a medium in similar circumstances, and not apt to offend the tenderest stomach.—Whites of eggs are also useful for clarifying liquors; to which purpose, being mixed and incorporated with the liquors to be clarified, and the whole afterwards boiled, the whites of eggs are by this means brought together and hardened, and thus carry off the gross parts of the liquor along with them.

ALBUQUERQUE, a small city in Spain, in the province of Estremadura, is seated on an eminence, nine miles from the frontiers of Portugal. It is command-

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ed by an almost impregnable fortress, built on a high mountain, and serving to defend the town. It carries on a great trade in wool and woollen manufactures. It was taken by the allies of Charles king of Spain, in 1705. W. Long. 7. o. N. Lat. 38. 52.

ALBURN, the English name of a compound colour, being a mixture of white and red, or reddish brown. Skinner derives the word, in this sense, from the Latin *albus*, and the Italian *burno*, from *bruno*, brown.

ALCA, or Auk, in ornithology, a genus of the order of anseres. The beak of this genus is without teeth, short, convex, compressed, and frequently furrowed transversely; the inferior mandible is gibbous near the base; the feet have generally three toes. The species of the alca are five.—1. The impennis, northern penguin, or great auk, with a compressed bill furrowed on each side, and an oval spot on each side of the eyes. According to Mr Martin, this bird breeds on the isle of St Kilda; appearing there the beginning of May, and retiring the middle of June. It lays one egg, which is six inches long, of a white colour; some are irregularly marked with purplish lines crossing each other, others blotched with black, and ferruginous about the thicker end: if the egg is taken away, it will not lay another that season. Mr Macaulay informs us that it does not visit that island annually, but sometimes keeps away for several years together; and adds, that it lays its egg close to the sea-mark, being incapable, by reason of the shortness of its wings, to mount higher. The length of this bird, to the end of its toes, is three feet: but its wings are so small, as to be useless for flight; the length, from the tip of the longest quill-feathers to the first joint, being only four inches and a quarter. This bird is observed by seamen never to wander beyond soundings; and according to its appearance they direct their measures, being then assured that land is not very remote. Thus the modern sailors pay respect to auguries, in the same manner as Aristophanes * tells us those of Greece did above 2000 years ago:

From birds, in sailing men instructions take;
Now lie in port; now sail, and profit make.

2. The alle, little auk, or black and white diver, with a smooth conical bill, a white streak on the belly and wings, and black feet. The bulk of this species exceeds not that of a black-bird.—3. The arctica, or puffin, with a compressed bill and four furrows; the orbit of the eyes and temples are white. The legs of this species are very small; and placed so far behind as to disqualify it from standing, except quite erect, resting not only on the foot, but the whole length of the leg. This circumstance * makes the rise of the puffin from the ground very difficult, and it meets with many falls before it gets on wing; but when that is effected, few birds fly longer or stronger. These birds frequent the coasts of several parts of Great Britain and Ireland; but no place in greater numbers than Prielstholt Isle, where their flocks may be compared to swarms of bees for multitude. These are birds of passage; they resort there annually about the fifth or tenth of April, quit the place (almost to a bird), and return twice or thrice before they settle to burrow and prepare for ovation and incubation. They begin to burrow the first week in May; but some few save themselves that trouble, and

Alburn,
Alca.

Great Auk,
PLIX, fig. 6.

Little Auk,
fig. 8.

The Puffin.

* It attends every one of the genus. See the posture of the Little Auk, fig. 8.

C c

dislodge

Alca.

dislodge the rabbits from their holes, taking possession of them till their departure from the isle. Those which form their own burrows, are at that time so intent on the work as to suffer themselves to be taken by the hand. This task falls chiefly to the share of the males; who also assist in incubation. The first young are hatched the beginning of July. The old ones shew vast affection towards them; and seem totally insensible of danger in the breeding season. If a parent is taken at that time, and suspended by the wings, it will in a sort of despair treat itself most cruelly, by biting every part it can reach; and the moment it is loosed, will never offer to escape, but instantly resort to its unledged young: this affection ceases at the stated time of migration, which is most punctually about the eleventh of August, when they leave such young as cannot fly, to the mercy of the peregrine falcon, who watches the mouths of the house for the appearance of the little deserted puffins, which, forced by hunger, are compelled to leave their burrows. They lay only one egg. The eggs differ much in form: some have one end very acute; others have both extremely obtuse; all are white. Their flesh is excessively rank, as they feed on sea-weeds and fish, especially sprats: but when pickled and preserved with spices, are admired by those who love high-eating. Dr Caius tells us, that, in his days, the church allowed them in lent, instead of fish: he also acquaints us, that they were taken by means of ferrets, as we take rabbits: at present, they are either dug out, or drawn from their burrows by a hooked stick: they bite extremely hard; and keep such fast hold on whatever they fasten, as not to be easily disengaged. Their noise, when taken, is very disagreeable; being like the efforts of a dumb person to speak. 4. The tora, or razor-bill, with four furrows on the bill, and a white line on each side running from the bill to the eyes. These birds, in company with the guillemot, appear in our seas the beginning of February; but do not settle on their breeding places till they begin to lay, about the beginning of May. They inhabit the ledges of the highest rocks that impend over the sea, where they form a grotesque appearance; sitting close together, and in rows one above another. They properly lay but one egg a-piece, of an extraordinary size for the bulk of the bird, being three inches long: it is either white, or of a pale sea-green, irregularly spotted with black: if this egg is destroyed, both the auk and the guillemot will lay another; if that is taken, then a third: they make no nest, depositing their egg on the bare rock; and tho' such multitudes lay contiguous, by a wonderful instinct each distinguishes its own. What is also matter of great amazement, they fix their egg on the smooth rock, with so exact a balance, as to secure it from rolling off; yet should it be removed, and then attempted to be replaced by the human hand, it is extremely difficult, if not impossible, to find its former equilibrium. The eggs are food to the inhabitants of the coasts they frequent; which they get with great hazard; being lowered from above by ropes, trusting to the strength of their companions, whose footing is often so unstable that they are forced down the precipice, and perish together. 5. The pica, or black-billed auk, has the bill of the same form with the tora, but is entirely black. The cheeks, chin, and throat, are white: in all other respects it agrees with the former species.

Razor-bill,
Pl. ix. fig. 7.

The winter residence of this genus, and that of the guillemot *, is but imperfectly known: it is probable they live at sea, in some more temperate climate, remote from land; forming those multitudes of birds that navigators observe in many parts of the ocean: they are always found there at certain seasons, retiring only at breeding time; when they repair to the northern latitudes, and during that period are found as near the pole as navigators have penetrated. During winter, razor-bills and puffins frequent the coast of Andalusia, but do not breed there.

ALCEUS, a famous ancient lyric poet, born at Mitylene, in the island of Lesbos. Horace seems to think him the inventor of this kind of poetry.

Now the Roman muse inspire,
And warm the song with Grecian fire.

Francis.

He flourished in the 44th Olympiad, at the same time with Sappho, who was likewise of Mitylene. Alceus was a great enemy to tyrants, but not a very brave soldier. He was present at an engagement, wherein the Athenians gained a victory over the Lesbians; and here, as he himself is said to have confessed in one of his pieces, he threw down his arms, and saved himself by flight. Horace, who, of all the Latin poets, most resembled Alceus, has made the like confession:

With thee I saw Philipp's plain,
Its fatal rout, a fearful scene;
And dropp'd, alas! th' inglorious shield,
Where valour's felt was forc'd to yield,
Where soll'd in dust the vanquish'd lay,
And breath'd th' indignant soul away.

Francis.

The poetical abilities of Alceus are indisputed; and though his writings were chiefly in the lyric strain, yet his muse was capable of treating the sublimest subjects with a suitable dignity. Hence Horace says,

Alceus strikes the golden strings,
And feast, and war, and exile, sings.
Thus while they strike the various lyre,
The ghosts the sacred sounds admire:
But when Alceus lifts the strain
To deeds of war and tyrants slain,
In thicker crowds the shadowy throng
Drink deeper down the martial song.

Francis.

ALCEUS, an Athenian tragic poet; and, as some think, the first composer of tragedies. He renounced his native country Mitylene, and passed for an Athenian. He left ten pieces, one of which was *Pasiphaë*, that which he produced when he disputed with Aristophanes, in the fourth year of the 97th Olympiad.

There is another ALCEUS mentioned in Plutarch, perhaps the same whom Porphyrius mentions as a composer of satirical iambics and epigrams, and who wrote a poem concerning the plagiarism of Euphorus the historian. He lived in the 145th Olympiad.

We are told likewise of one ALCEUS, a Messenian, who lived in the reign of Vespasian and Titus. We know not which of these it was who suffered for his lewdness a very singular kind of death, which gave occasion to the following epitaph:

Ἀλκαίου τρεῖς ὄντες, &c.

This is Alceus's tomb, who died by a radish,
The daughter of the earth, and punisher of Adulterers.

This punishment inflicted on adulterers*, was thrusting one of the largest radishes up the anus of the adulterer; or, for want of radishes, they made use of a fish † with

Alceus.
See Oym.
bur.

Ode xxxii.
Lib. I.

Ode vii.
Lib. II.

* See the
article Adul-
tery.
† See Mugil.
a

Alcaics a very large head, which Juvenal alludes to:

Ænosiam machos et mugilis intrat.
The mullet enters me behind.

Sat. x.
ver. 316.

Hence we may understand the menace of Catullus,

*Ah! tum te miserum, malique fati,
Quem atrastis pedibus, patente porta,
Percurrent raphanisque mugilesque.*

Epig. xv.

Ah! wretched thou, and born to luckless fate,
Who art discover'd by the unshut gate!
If once, alas! the jealous husband come,
The radish, or the sea-fish, is thy doom.

ALCAICS, in ancient poetry, a denomination given to several kinds of verse, from Alcæus their inventor.

The first kind consists of five feet, viz. a spondee, or iambic; an iambic; a long syllable; a dactyle; another dactyle: such is the following verse of Horace,

*Omnes | eodem cogimus, | omnium
Versatur urbs | Jervius | oculus |
Sors exitura.*

The second kind consists of two dactyles and two trochees: as,

Exilium | impossitura | cymba.

Besides these two, which are called dactylic Alcaics, there is another styled simply Alcaic; consisting of an epitrite; a coriambus; another coriambus; and a bacchius: the following is of this species,

Cur times | solum Tiberim | tangere, cur | olivum?

ALCAIC Ode, a kind of manly ode composed of several strophes, each consisting of four verses; the two first of which are always Alcaics of the first kind; the third verse is a diameter hypercatalectic, or consisting of four feet and a long syllable; and the fourth verse is an Alcaic of the second kind. The following strophe is of this species, which Horace calls *minaces Alcaei camene*.

*Non possidentem multa vocaveris
Rette beatum: rectius occupat
Nomen beati, qui deorum
Muneribus sapienter uti, &c.*

ALCAID, ALCAÏDE, or ALCALDE, in the polity of the Moors, Spaniards, and Portuguese, a magistrate, or officer of justice, answering nearly to the French provost, and the British justice of peace.—The alcaid among the Moors is vested with supreme jurisdiction, both in civil and criminal cases.

ALCALA DE GUADARA, a small town of Spain, in Andalusia, upon the river Guadaira. Here are abundance of springs, from whence they convey water to Seville by an aqueduct. W. Long. 6. 16. N. lat. 37. 15.

ALCALA de Henares, a beautiful and large city of Spain, in new Castile, seated upon the river Henares, which washes its walls. It is built in a very agreeable plain, and is of an oval figure. The streets are handsome and pretty straight; one of them is very long, running from one end of the city to the other. The houses are well built; and there are several squares, the largest of which is an ornament to the city; it is surrounded on all sides with piazzas, where tradesmen have their shops, to expose several sorts of commodities to sale, of which there is as great plenty and variety as in most towns of Spain. The university was founded by cardinal Ximenes, archbishop of Toledo, about the beginning of the 16th century. The land about Alcala is watered by the Henares, well cultivated, and very fruitful, while

that at a distance is dry and sterile: it yields grain in plenty, very good muscat wine, and melons of a delicious kind. Without the walls is a spring, the water of which is so pure, and so well tasted, that it is inclosed and shut up for the king of Spain's own use, from whence it is carried to Madrid.—This city is 10 miles south-west of Guadalaxara, and 13 miles east of Madrid. W. Long. 4. 20. N. Lat. 40. 30.

ALCALA-Real, a small city of Spain, in Andalusia, with a fine abbey. It is built on the top of a high mountain, in a mountainous country; and the road to it is incommodious, rough, and unequal; but to make amends for this, here are several kinds of exquisite fruit and wine. W. Long. 4. 15. N. Lat. 37. 18.

ALCALY, or ALKALI. See CHEMISTRY, n° 23, 119, 184, 274, 316, 389.

ALCANIS, a town of Arragon in Spain, seated on the river Guadaloup, twelve miles from Caspe. It was formerly the capital of the kingdom of the Moors; but being taken from them, it was made a commandery of the order of Calatrava. Here is a very remarkable fountain, which throws up water through 42 pipes. It is surrounded with gardens and fruit-trees, and defended with a good fortress. W. Long. o. 5. N. Lat. 41. o.

ALCANNA, in commerce, a powder prepared from the leaves of the Egyptian privet, in which the people of Cairo drive a considerable trade. It is much used by the Turkish women to give a golden colour to their nails and hair. In dyeing, it gives a yellow colour when steeped with common water, and a red one when infused in vinegar. There is also an oil extracted from the berries of alcanna, and used in medicine as a calm-cr.

ALCANTARA, a small, but very strong city of Estremadura, in Spain. It gives name to one of the three orders of knighthood. It is seated on the banks of the Tajo, or Tagus, 21 miles from Coria, in a very fruitful soil, and is celebrated for its bridge over that river. This was built in the time of the emperor Trajan, as appears by an inscription over one of the arches, by the people of Lusitania, who were assailed to supply the expence: it is raised 200 feet above the level of the water; and though it consists but of six arches, is 670 feet in length, and 28 in breadth. At the entrance of the bridge, there is a small antique chapel hewn in a rock by the ancient Pagans, who dedicated it to Trajan, as the Christians did to St Julian. This city was built by the Moors, on account of the convenience of this bridge; which is at a place where the Tajo is very deep, running between two high steep rocks: for this reason, they called it *Al-Cantara*, which, in their language, signifies the *Bridge*. It was taken from them in 1214, and given to the knights of *Calatrava*, who afterwards assumed the name of *Alcantara*. It was taken by the earl of Galloway, in April, 1706, and retaken by the French in November following. It is 45 miles from Madrid, and 125 from Seville. W. Long. 7. 12. N. Lat. 39. 30.

Knights of ALCANTARA, a military order of Spain, which took its name from the above mentioned city. They make a very considerable figure in the history of the expeditions against the Moors.

ALCAREZ, a small city of La Mancha, in Spain, defended by a pretty strong castle, and remarkable for

Alcala
||
Alcaez.

Alcazar
||
Alce

an ancient aqueduct. It stands near the river Guardamena, and the soil about it is very fruitful. They have a breed of little running-horses, which are very fleet and strong. It is 25 miles north of the confines of Andalusia, 108 south of Cuenza, and 138 south-by-east of Madrid. W. Long. 1. 50. N. Lat. 38. 28.

ALCASSAR DO SAL, a town of Portugal, in Estremadura, which has a castle said to be impregnable. It is indeed very strong both by art and nature, being built on the top of a rock which is exceedingly steep on all sides. Here is a salt-work which produces very fine white salt, from whence the town takes its name. The fields produce large quantities of a sort of rushes, of which they make mats, which are transported out of the kingdom. W. long. 9. 10. N. lat. 38. 18.

ALCASSAR, a city of Barbary, seated about two leagues from Larache, in Asfa, a province of the kingdom of Fez. It was of great note, and the seat of the governor of this part of the kingdom. It was built by Jacob Almanzor, king of Fez, about the year 1180, and designed for a magazine and place of rendezvous for the great preparations he was making to enter Granada in Spain; and to make good the footing Joseph Almanzor had got some time before. It is said his father first invaded Spain with 300,000 men, most of whom he was obliged to bring back to Africa to quiet a rebellion that had broke out in Morocco. This done, he returned to Spain again with an army, as is said, of 200,000 horse, and 300,000 foot. The city is now fallen greatly to decay, so that of fifteen mosques there are only two that they make use of. The reason, probably, is the bad situation of the town; for it stands so low, that it is excessively hot in summer, and almost overflowed with water in the winter. This they affirm to be owing to a curse of one of their saints. Here are a great number of storks, who live very familiarly with the people, walking about the town, possessing the tops of the houses and mosques without molestation; for they esteem them sacred birds, and account it sinful to disturb them. At present, the bashaw of Tetuan appoints a governor to this town, which is the last of his dominions towards Mequinez. Near this city there is a high ridge of mountains, running towards Tetuan, whose inhabitants were never brought entirely under subjection; and whenever it was attempted, they revenged themselves by infesting the roads, and robbing and destroying the travellers; when they were pursued, they retired into their woody mountains, where none could safely follow them. Not far from hence is the river Elmahallen, famous for the battle fought between Don Sebastian king of Portugal, and the Moors; in which the Portuguese were defeated, and their king slain. W. Long. 12 35. N. Lat. 35. 15.

ALCAZAR LEGER, a town of Africa, in the kingdom of Fez, and in the province of Ilabat. It was taken by Alphonso, king of Portugal, in 1468; but soon after that, it was abandoned to the Moors. It is seated on the coast of the straits of Gibraltar. W. Long. 5. 30. N. Lat. 38. 0.

ALCAZER, a town of Spain, in New Castile, seated on the river Guardamana, which has a fortress on a high hill for its defence, and lies in a very fruitful country. It is 100 miles north-west of Carthage. W. long. 2. 10. N. lat. 38. 15.

ALCE, Alces, or Elk, in zoology, the trivial

name of a species of the cervus, belonging to the order of mammalia pecora. See CERVUS.

ALCEA, the HOLLY-HOCK; a genus of the polyandria order, belonging to the monodelphia class of plants.

Species. Although Linnæus mentions two distinct species of this genus, viz. the *rosea* and *scissifolia*, he thinks, that the latter may perhaps be only a variety of the former; but Mr Miller affirms them to be distinct species, whose difference in the form of their leaves always continues: The leaves of the first sort are roundish, and cut at their extremities into angles; those of the second are deeply cut into six or seven segments, so as to resemble a hand. Cultivation produces almost an infinite variety of this plant, such as double-flowered, single-flowered, deep red, pale red, blackish red, white, purple, yellow, and flesh-colour. The first species is a native of China, the second grows also in Istria. Tho' natives of warm countries, they are hardly enough to thrive in the open air in Britain, and have for many years been some of the greatest ornaments in gardens, towards the end of summer; but they have the inconvenience of growing too large for small gardens, and requiring tall stakes to secure them from being broken by strong winds. In large gardens, however, when properly disposed, they make a fine appearance; for as their spikes of flowers grow very tall, there will be a succession of them on the same stems more than two months: the flowers on the lower part of the spike appear in July; and as their stalks advance, new flowers are produced till near the end of September. When planted in good ground, the stalks will often rise to the height of eight or nine feet; so that near fix feet of each will be garnished with flowers, which, when double and of good colours, make a very beautiful appearance.

Culture. The holly-hock is propagated by seeds, which should be carefully sowed from those plants whose flowers are double and of the best colours: for though the duplicity of the flowers, as well as their colour, are only accidental properties, yet the young plants will produce nearly the same kind of flowers with those from which the seeds are taken, provided no plants with single or bad-coloured flowers are permitted to grow near them; and as soon as such appear they ought to be removed from the good ones, that their farina may not spread into the others, which would cause them to degenerate. The seeds ought to be gathered very dry, and remain in their capsules until spring; but care must be taken that no wet comes to them in winter, otherwise the covers would turn mouldy, and spoil their contents.—They should be sown in drills, about the middle of April, on a bed of light earth, and covered with earth of the same kind about half an inch deep. When the plants have put out six or eight leaves, they should be transplanted into nursery-beds, observing to water them until they have taken good root; after which they will require no farther care, but to keep them clean from weeds till October, when they should be transplanted where they are to remain.

ALCEDO, or KINGFISHER, in ornithology, a genus of the order of picæ. The alcedo has a long, straight, thick, triangular bill; with a fleshy, plain, short, flat tongue. There are seven species of the alcedo.

1. The *ispida*, or common kingfisher, haunts the shores of Europe and Asia. It is not much larger than

Alcedo
||
Alcedo.

Plate IX.

Fig. 1. AIR GUN.



Fig. 2.



Fig. 3.

MAGAZINE AIR GUN.

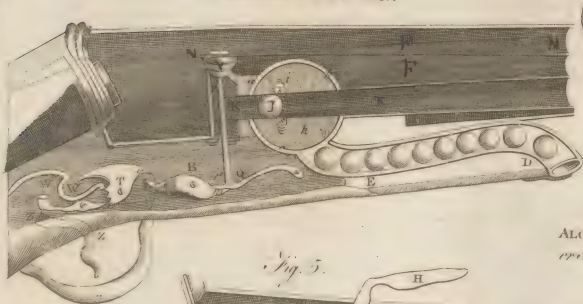


Fig. 4.

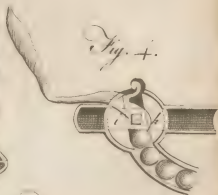


Fig. 5.

ALCEDO ISPIDA,
or Kingfisher.



Fig. 6.

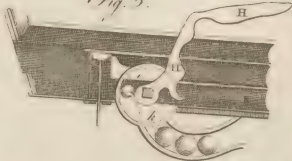


Fig. 7.

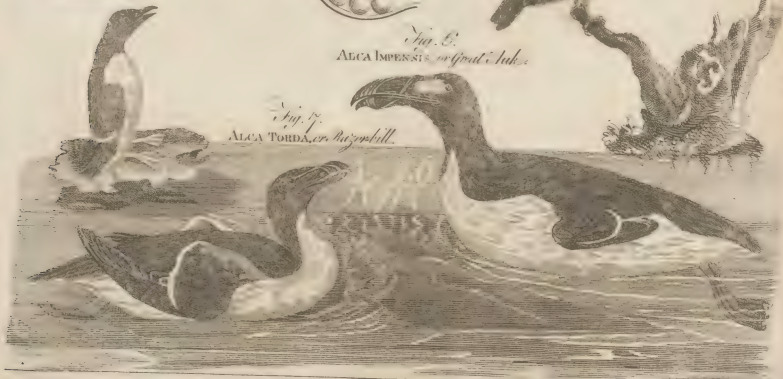
ALCA IMPENSIS, or Great Auk.

Fig. 8.

ALCA ALLE,
or Little Auk.

Fig. 9.

ALCA TORDA, or Razorbill.





Alcedo,
or
kingfisher.

a swallow; its shape is clumsy; the bill disproportionably long; it is two inches from the base to the tip; the upper chap black, and the lower yellow. But the colours of this bird atone for its inelegant form: the crown of the head and the coverts of the wings are of a deep blackish green, spotted with bright azure; the back and tail are of the most resplendent azure; the whole under-side of the body is orange-coloured; a broad mark of the same, passes from the bill beyond the eyes; beyond that, is a large white spot; the tail is short, and consists of twelve feathers of a rich deep blue; the feet are of a reddish yellow, and the three joints of the out-moist toe adhere to the middle toe, while the inner-toe adheres only by one.

From the diminutive size, the slender short legs, and the beautiful colours of this bird, no person would be led to suppose it one of the most rapacious little animals that skims the deep. Yet it is for ever on the wing, and feeds on fish; which it takes in surprising quantities, when we consider its size and figure. It takes its prey after the manner of the osprey, balancing itself at a certain distance above the water for a considerable space, then darting into the deep, and seizing the fish with inevitable certainty. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colours. This striking attitude did not escape the notice of the ancients; for Ibycus, as quoted by Athenæus, styles these birds *αλκυονες τανυστιγγοι*, the halcyons with expanded wings. It makes its nest in holes in the sides of the cliffs, which it scoops to the depth of three feet; and lays from five to nine eggs, of a most beautiful semi-transparent white: the nest is very fetid, by reason of the remains of the fish brought to feed the young. The female begins to lay early in the season; and excludes her first brood about the beginning of April. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed; and she, contrary to most other birds, is found plump and fat at that season. The male, that used to twitter before this, now enters the nest as quietly and as privately as possible. The young ones are hatched at the expiration of 20 days; but are seen to differ as well in their size as in their beauty.

This species is the *αλκυοναυγος*, or, mute halcyon of Aristotle, which he describes with more precision than is usual with that great philosopher: after his description of the bird, follows that of its nest, than which the most inventive of the ancients have delivered nothing that appears at first sight more fabulous and extravagant. He relates, that it resembled those concretions that are formed by the sea-water; that it resembled the long-necked gourd; that it was hollow within; that the entrance was very narrow, so that, should it over-set, the water could not enter; that it resisted any violence from iron, but could be broke with a blow from the hand; and that it was composed of the bones of the *βιαδον*, or sea-needle. The nest had medical virtues ascribed to it; and from the bird was called *Halcyonem*. In a fabulous age, every odd substance that was flung ashore received that name; a species of tubular coral, a sponge, a zoophyte, and a miscellaneous concrete, having by the ancients been dignified with that title from their imaginary origin*. Yet much of this seems to be founded on truth. The form of the

nest is justly described; and the materials which Aristotle says it was composed of, are not entirely of his own invention. Whoever has seen the nest of the kingfisher, will observe it strewn with the bones and scales of fish; the fragments of the food of the owner and its young.—On the foundation laid by the philosopher, succeeding writers formed other tales extremely absurd; and the poets, indulging the powers of imagination, dressed the story in all the robes of romance. This nest was a floating one:

Incubat halcyone pendentebus æquore nidis. OVID. Met. lib. xi.

It was therefore necessary to place it in a tranquil sea, and to supply the bird with charms to allay the fury of a turbulent element during the time of its incubation; for it had, at that season, power over the seas and the winds.

*Χ' αλκυονες σφραγισσιντι τα κυματα, τῇ τῇ Σηλασσει,
Τὸν τινάον, τοῦ τ' ἑσθον, οἱ ἰσχυρα θυκὴ χιμῇ
Ἀλκυονες, γλαυκῆσι Νηρηϊστῇσι τὴ μαλιστα
Οὐρανὸν ἰσχυάδι.* THEOCRIT. Idyl. vii. l. 57.

May Halcyons smooth the waves, and calm the seas,
And the rough south-east sink into a breeze;
Halcyons, of all the birds that haunt the main,
Most lov'd and honour'd by the Nereid train. FAWKES.

These birds were equally favourites with Thetis as with the Nereids;

Dilectæ Thetidi Halcyones. VIRG. Georg. l. 399.

as if by their influence these deities owed a repose in the midst of the storms of winter, and by their means were secured from those winds that disturb their submarine retreats, and agitated even the plants at the bottom of the ocean.

Such are the accounts given by the Roman and Sicilian poets. Aristotle and Pliny tell us, that this bird is most common in the seas of Sicily: that it fat only a few days, and those in the depth of winter; and during that period the mariner might fail in full security; for which reason they were styled *Halcyon days*.

Perque dies placidos hiberno tempore septem.

Incubat Halcyone pendentebus æquore nidis:

Tum via tuta maris: ventos cuitodit, et arcet

Aëolis egressu. OVID. Met. lib. XI.

*Alcyon, compris'd,
Seven days sits brooding on her watery nest,
A wintry queen; her fire at length is kind,
Calms every storm, and hushes every wind. DRYDEN.*

In after-times, these words expressed any season of prosperity: these were the *Halcyon days* of the poets; the brief tranquillity, the *septem placidi dies*, of human life.

The poets also made it a bird of song. Virgil seems to place it in the same rank with the linnet;

Littoraque Halcyonem resonant, et Acanthida dum.

GEORG. III. 338.

And Silus Italicus celebrates its music, and its floating nest:

Cum sonat Halcyone cantu, nidisque natantes

Immota gestat sopitis fluctibus unda. Lib. XIV. 275.

But these writers seem to have transferred to our species, the harmony that belongs to the vocal alcedo*, * Arist. hist. an. 892.

As the ancients have had their fables concerning this bird, so have the modern vulgar. It is an opinion generally received among them, that the flesh of the kingfisher will not corrupt, and that it will even banish

Alcedo,
or
kingfisher.

* Plin.
lib. xxxii.
c. 8.
Diof. lib. v.
c. 94.

Alcedo
Al'ciat.

banish all vermin. This has no better foundation than that which is said of its always pointing, when hung up dead, with its breast to the north. The only truth which can be affirmed of this bird when killed is, that its flesh is utterly unfit to be eaten; while its beautiful plumage preserves its lustre longer than that of any other bird we know.

The other species are, 2. The crathaca, with a short tail, a blue back, a yellow bill, a purple head and rump, and the throat and opposite part of the neck white. It is a native of Bengal. 3. The alcyon with a short black tail, white belly, and ferruginous breast. It is a native of America. Its cry, its solitary abode about rivers, and its manner of feeding, are much the same as of those in Britain. It preys not only on fish, but likewise on lizards. 4. The todus, with a short green tail, a blood-coloured throat, and a white belly. It is a native of America; and is the green sparrow, or green humming-bird, of Edwards. 5. The myrmecis, with a short green tail, ferruginous wings, and a green back. It is a native of Africa, and Asia. 6. The rudis, with a brown short tail variegated with white. It is a native of Persia and Egypt. 7. The dea, with two very long feathers in the tail, a blackish blue body, and greenish wings. It is a native of Surinam. All these likewise dive in the water, and catch fish with their long beaks.

ALCHEMILLA, or LADIES-MANTLE, a genus of the monogynia order, belonging to the tetrandria class of plants. Of this genus there are three

Species. 1. The vulgaris, or common ladies-mantle, with leaves plaited like a fan, and yellowish-green blossoms. It grows naturally in pasture-lands in this as well as in most other countries in Europe. The leaves discover to the taste a moderate astringency; and were formerly much esteemed in some female weaknesses, and in fluxes of the belly. They are now rarely made use of, tho' both the leaves and roots might doubtless be of service in cases where mild astringents are required. In the province of Smolandia in Gothland, they make a tincture of the leaves, and give it in spasmodic or convulsive diseases. Horses, sheep, and goats, eat it; cows are not fond of it; swine refuse it.—2. The alpina, or cinque-foil ladies-mantle, with finger-shaped sawed leaves, and greenish blossoms. It is a native of the mountainous parts of Europe. Goats and cows eat it; horses, sheep, and swine, refuse it.—3. The minor, or least ladies-mantle, with five smooth leaves growing at a joint and cut into many segments. It grows naturally in Sweden, Lapland, and other cold countries. Eaten by cows and goats; refused by horses, sheep, and swine.

Culture. These plants have perennial roots, and annual stalks. They are easily propagated by parting of their roots, or sowing their seeds in autumn. They should have a moist soil and shady situation, and be kept clear from weeds; which is all the culture they require.

ALCHEMIST, a practitioner in alchemy.

ALCHEMY, that branch of chemistry which had for its principal objects, the transmutation of metals into gold; the panacea, or universal remedy; an alkali, or universal menstruum; an universal ferment; and many other things equally ridiculous†.

ALCIAT (Andrew), a great lawyer, who flourished in the 16th century, born at Milan. He mixed much of polite learning in the explication of the laws,

and happily drove out the barbarity of language which till then had reigned in the lectures and writings of lawyers; for which Thuanus highly praises him. He published a great many law-books, and some notes upon Tacitus. His Emblems have been much admired, and translated into French, Italian, and Spanish; and several learned men have written commentaries on them.

ALCIBIADES, an Athenian general. It was the fate of this great man to live at a time when his country was a scene of confusion. The Greeks, grown insolent from their conquests in Persia, turned their arms against each other, and banded together under the conduct of the two most opulent states Athens and Lacedæmon. Alcibiades, in the midst of an expedition he had planned against the enemy of his country, was recalled home to answer some charge of a private nature; but fearing the violence of his enemies, instead of going to Athens, he offered his services at Sparta, where they were readily accepted. By his advice the Lacedæmonians made a league with Persia, which gave a very favourable turn to their affairs. But his credit in the republic raising jealousies against him, he privately reconciled himself to his country, and took again the command of an Athenian army. Here victory, waiting as it were at his command, attended all his motions. The loss of seven battles obliged the Spartans to sue for peace. He enjoyed his triumphs, however, only a short time at Athens. One unsuccessful event made him again obnoxious to the malice of his citizens; and he found it expedient to retire from Athens. In his absence the Spartans again took the lead, and at the fatal battle of Ægos entirely subdued the Athenian power. Alcibiades, though an exile, endeavoured to restore the power of his country; of which the Spartans having intelligence, procured him to be assassinated. He was a man of admirable accomplishments, but indifferently principled; of great parts; and of an amazing versatility of genius.

ALCINOUS, king of the Phæacians, in the island now called *Corfu*, was son of Nautilus, and grandson of Neptune and Peribea. It is by his gardens this king has chiefly immortalized his memory. He received Ulysses with much civility, when a storm had cast him on his coast. The people here loved pleasure and good cheer, yet were skilful seamen; and Alcinous was a good prince.

ALCMAER, a city of the United Provinces, situated in North Holland, about four miles from the sea, fifteen from Haerlem, and eighteen from Amsterdam. It is a handsome city, and one of the cleanest in Holland. The streets and houses are extremely neat and regular, and the public buildings very beautiful. It had formerly two parish-churches, dedicated to St Matthew and St Lawrence. The latter had so high a tower, that it served for a sea-mark to the vessels that were in the open sea; but, in 1464, it tumbled down, and damaged the other church so much, that they were both demolished in 1470, and one church was built in their stead, dedicated to the same saints. The Spaniards, under the command of Frederic of Toledo, son of the duke d'Alva, came to besiege it, after they had taken Haerlem in 1573; but were forced to raise the siege, after three months lying before it, as well on account of the infection of the air as the stout resistance of the inhabitants and soldiers; even the women

Alcibiades
||
Alcmaer.

† See *Chemistry*, no 5, 10.

Alcman
Alcock.

men signaling themselves bravely in its defence. It is recorded in the register of this city, that, in the year 1637, one hundred and twenty tulips, with the off-sets, fold for 90,000 florins. The town has a very good trade in butter and cheese, of which a vast quantity is sold every year, and is esteemed the best in Holland. E. long. 4. 26. N. lat. 52. 28.

ALCMAN, a lyric poet, who flourished in the 27th Olympiad. He was born at Sparta; and composed several poems, of which only some fragments are remaining, quoted by Athenæus and some other ancient writers. He was very amorous; accounted the father of gallant poetry; and is said to have been the first that introduced the custom of singing love-songs in company. He is reported to have been one of the greatest eaters of his age; upon which Mr Bayle remarks, that such a quality would have been extremely inconvenient, if poetry had been at that time upon such a footing as it has been often since, not able to procure the poet bread. He died of a strange disease; for he was eat up with lice.

ALCMANIAN, in ancient lyric poetry, a kind of verse consisting of two dactyls and two trochees; as,—
Virgibus puerisque canto.

The word is formed from *Alcman*, the name of an ancient Greek poet, in great esteem for his erotic or amorous compositions.

ALCMENA, the daughter of Electryo king of Mycenæ, and wife of Amphitryon. Jupiter putting on the shape of her husband while he was abroad in the wars, begot Hercules upon her: he made that night as long as three ordinary ones.

ALCOA ARBOR, the name of a tree in St Helena, said to emulate ebony.

ALCOCK (John), doctor of laws, and bishop of Ely in the reign of king Henry VII. born at Beverly in Yorkshire, and educated at Cambridge. He was first made dean of Westminster, and afterwards appointed master of the rolls. In 1471, he was consecrated bishop of Rochester: in 1476, he was translated to the see of Worcester; and in 1486, to that of Ely, in the room of Dr John Morton, preferred to the see of Canterbury. He was a prelate of great learning and piety; and so highly esteemed by king Henry, that he appointed him lord president of Wales, and afterwards lord chancellor of England. Alcock founded a school at Kingston upon Hull, and built the spacious hall belonging to the episcopal palace at Ely. He was also the founder of Jesus-college in Cambridge, for a master, six fellows, and as many scholars. This house was formerly a nunnery, dedicated to St Radigund; and, as Godwin tells us, the building being greatly decayed, and the revenues reduced almost to nothing, the nuns had all forsaken it, except two; whereupon bishop Alcock procured a grant from the crown, and converted it into a college. But Camden and others tell us, that the nuns of that house were so notorious for their incontinence, that King Henry VII. and Pope Julius II. consented to its dissolution: Bale accordingly calls this nunnery *spiritualium meretricum cœnobilium*, “a community of spiritual harlots.” Bishop Alcock wrote several pieces, amongst which are the following: 1. *Mons Perfectionis*. 2. *In Psalmos Penitentiales*. 3. *Homilia Vulgares*. 4. *Meditationes Pie*. He died October 1st, 1500; and was buried in

the chapel he had built at Kingston upon Hull.

ALCOHOL, or **ALKOOL**, in chemistry, spirit of wine highly rectified *. It is also used for any highly rectified spirit.—Alcohol is extremely light and inflammable: It is a strong antiseptic, and therefore employed to preserve animal substances.

ALCOHOL is also used for any fine impalpable powder.

ALCOHOLIZATION, the process of rectifying any spirit. It is also used for pulverization.

ALCORAN, or **AL-KORAN**, the scripture, or bible, of the Mahometans. The word is compounded of the Arabic particle *al*, and *coran* or *koran*, derived from verb *caraa* or *karaa*, to read. The word therefore properly signifies, the reading; or rather, *that which ought to be read*. By this name the Mahometans denote not only the entire book or volume of the Koran, but also any particular chapter or section of it; just as the Jews call either the whole scripture, or any part of it, by the name of *Karak*, or *Mikra*, words of the same origin and import.

Besides this peculiar name, the Koran is also honoured with several appellations common to other books of scripture: as, *al Farkan*, from the verb *foraka*, to divide or distinguish; not, as the Mahometan doctors say, because those books are divided into chapters or sections, or distinguish between good and evil; but in the same notion that the Jews use the word *Perek*, or *Pirka*, from the same root, to denote a section or portion of scripture. It is also called *al Moftaf*, the volume, and *al Kitab*, the book, by way of eminence, which answers to the *Biblia* of the Greeks; and *al Dhikr*, the admonition, which name is also given to the Pentateuch and Gospel.

The Koran is divided into 114 larger portions of very unequal length, which we call *chapters*; but the Arabians *sawar*, in the singular *sura*; a word rarely used on any other occasion, and properly signifying a row, order, or a regular series; as a course of bricks in building, or a rank of soldiers in an army; and is the same in use and import with the *Sura*, or *Tora*, of the Jews, who also call the fifty-three sections of the Pentateuch *Sedarim*, a word of the same signification.

These chapters are not, in the manuscript copies, distinguished by their numerical order, but by particular titles, which are taken sometimes from a particular matter treated of, or person mentioned therein; but usually from the first word of note, exactly in the same manner as the Jews have named their *Sedarim*; though the word from which some chapters are denominated be very far distant, towards the middle, or perhaps the end, of the chapter; which seems ridiculous. But the occasion of this appears to have been, that the verse or passage wherein such word occurs, was, in point of time, revealed and committed to writing before the other verses of the same chapter which precede it in order; and the title being given to the chapter before it was completed, or the passages reduced to their present order, the verse from whence such title was taken did not always happen to begin the chapter. Some chapters have two or more titles, occasioned by the difference of the copies.

Some of the chapters having been revealed at Mecca, and others at Medina, the noting this difference makes a part of the title: but the reader will observe, that several

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* See Chemistry, n^o 560.

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veral of the chapters are said to have been revealed partly at Mecca, and partly at Medina; and, as to others, it is yet a dispute among the commentators to which of the two places they belong.

Every chapter is subdivided into smaller portions, of very unequal length also, which we customarily call *verses*: but the Arabic word is *ayat*, the same with the Hebrew *othoth*, and signifies *signs* or *wonders*: such as are the secrets of God, his attributes, works, judgments, and ordinances, delivered in those verses; many of which have their particular titles also, imposed in the same manner as those of the chapters.

Besides these unequal divisions of chapter and verse, the Mahometans have also divided their Koran into sixty equal portions, which they call *Azab*, in the singular *Hizb*, each subdivided into four equal parts; which is also an imitation of the Jews, who have an ancient division of their Mishna into sixty portions called *Massekoth*. But the Koran is more usually divided into thirty sections only, named *Ajza*, from the singular *Juz*, each of twice the length of the former, and in the like manner subdivided into four parts. These divisions are for the use of the readers of the Koran in the royal temples, or in the adjoining chapels where the emperors and great men are interred. There are thirty of these readers belonging to every chapel, and each reads his section every day, so that the whole Koran is read over once a-day.

Next after the title, at the head of every chapter, except only the ninth, is prefixed the following solemn form, by the Mahometans called the *Bismallah*, IN THE NAME OF THE MOST MERCIFUL GOD; which form they constantly place at the beginning of all their books and writings in general, as a peculiar mark or distinguishing characteristic of their religion, it being counted a sort of impiety to omit it. The Jews, for the same purpose, make use of the form, *In the name of the LORD*, or, *In the name of the great God*; and the eastern Christians that of, *In the name of the Father, and of the Son, and of the Holy Ghost*. But Mahomet probably took this form, as he did many other things, from the Persian Magi, who used to begin their books in these words, *Bunam Yazdan bakhshayegher dadar*; that is, *In the name of the most merciful just God*.

There are twenty-nine chapters of the Koran, which have this peculiarity, that they begin with certain letters of the alphabet, some with a single one, others with more. These letters the Mahometans believe to be the peculiar marks of the Koran, and to conceal several profound mysteries, the certain understanding of which, the more intelligent confess, has not been communicated to any mortal, their prophet only excepted. Notwithstanding which, some will take the liberty of guessing at their meaning by that species of Cabala called by the Jews *Notarikon*, and suppose the letters to stand for as many words, expressing the names and attributes of God, his works, ordinances, and decrees; and therefore these mysterious letters, as well as the verses themselves, seem in the Koran to be called *signs*. Others explain the intent of these letters from their nature or organ, or else from their value in numbers, according to

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another species of the Jewish Cabala called *Gematria*; the uncertainty of which conjectures sufficiently appears from their disagreement. Thus, for example, five chapters, one of which is the second, begins with these letters, A. L. M. which some imagine to stand for *Allah latif magid*, "God is gracious and to be glorified;" or, *Ana li mini*, i. e. *to me and from me*, viz. belongs all perfection, and proceeds all good; or else for *Ana Allah al-lam*, "I am the most wise God," taking the first letter to mark the beginning of the first word, the second the middle of the second word, and the third the last of the third word; or for *Allah, Gabriel, Mohammed*, the author, revealer, and preacher of the Koran. Others say, that as the letter A belongs to the lower part of the throat, the first of the organs of speech; L to the palate, the middle organ; and M to the lips, which are the last organ; so these letters signify that God is the beginning, middle, and end, or ought to be praised in the beginning, middle, and end, of all our words and actions: or, as the total value of those three letters, in numbers, is seventy-one, they signify, that, in the space of so many years, the religion preached in the Koran should be fully established. The conjecture of a learned Christian is at least as certain as any of the former, who supposes those letters were set there by the amanuensis, for *Amar li Mohammed*, i. e. *At the command of Mohammed*, as the five letters prefixed to the nineteenth chapter seem to be there written by a Jewish scribe, for *Coh yaas*, i. e. *Thus he commanded*.

The Koran is universally allowed to be written with the utmost elegance and purity of language, in the dialect of the tribe of Korcish, the most noble and polite of all the Arabians, but with some mixture, though very rarely, of other dialects. It is confessedly the standard of the Arabic tongue, and, as the more orthodox believe, and are taught by the book itself, inimitable by any human pen (though some sectaries have been of another opinion), and therefore insisted on as a permanent miracle, greater than that of raising the dead, and alone sufficient to convince the world of its divine original.

And to this miracle did Mahomet himself chiefly appeal for the confirmation of his mission, publicly challenging the most eloquent men in Arabia, which was at that time stocked with thousands whose sole study and ambition it was to excel in elegance of style and composition, to produce even a single chapter that might be compared with it (A).

To the pomp and harmony of expression some ascribe all the force and effect of the Alcoran; which they consider as a sort of music, equally fitted with other species of that art to ravish and amaze. In this Mahomet succeeded so well, and so strangely captivated the minds of his audience, that several of his opponents thought it the effect of witchcraft and enchantment, as he himself complains.—Others have attributed the effect of the Alcoran to the frequent mention of rewards and punishments; heaven and hell occurring almost in every page. Some suppose, that the sensual pleasures of paradise, so frequently set before the imaginations of the readers of the Alcoran, were what chiefly bewitched them. Tho', with

(A) As the composition and arrangement of words, however, admit of infinite varieties, it can never be absolutely said that any one is the best possible. In fact, Hamzah Benahmed wrote a book against the alcoran with at least equal elegance; and Moselema another, which even surpassed it, and occasioned a defection of a great part of the Mussulmans. *Journ. de Scav. tom. xiii. p. 280. Oeuvr. de Scav. Nov. 1708. p. 404.*

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with regard to these, there is great dispute whether they are to be understood literally or spiritually. Several have even allegorized the whole book.

The general design of the Koran was to unite the professors of the three different religions then followed in the populous country of Arabia, (who, for the most part, lived promiscuously, and wandered without guides, the far greater number being idolaters, and the rest Jews and Christians mostly of erroneous and heterodox belief) in the knowledge and worship of one God, under the sanction of certain laws, and the outward signs of ceremonies partly of ancient and partly of novel institution, enforced by the consideration of rewards and punishments both temporal and eternal; and to bring them all to the obedience of Mahomet, as the prophet and ambassador of God, who, after the repeated admonitions, promises, and threats, of former ages, was at last to establish and propagate God's religion on earth, and to be acknowledged chief pontiff in spiritual matters, as well as supreme prince in temporal.

The great doctrine then of the Koran, is the unity of God; to restore which point Mahomet pretended was the chief end of his mission; it being laid down by him as a fundamental truth, that there never was, nor ever can be, more than one true orthodox religion. For, though the particular laws or ceremonies are only temporary, and subject to alteration, according to the divine direction; yet, the substance of it being eternal truth, is not liable to change, but continues immutably the same. And he taught, that, whenever this religion became neglected, or corrupted in essentials, God had the goodness to re-inform and re-admonish mankind thereof, by several prophets, of whom Moses and Jesus were the most distinguished, till the appearance of Mahomet, who is their seal, and no other to be expected after him. The more effectually to engage people to hearken to him, great part of the Koran is employed in relating examples of dreadful punishments formerly inflicted by God on those who rejected and abused his messengers; several of which stories, or some circumstances of them, are taken from the Old and New Testaments, but many more from the apocryphal books and traditions of the Jews and Christians of those ages, set up in the Koran as truths in opposition to the scriptures, which the Jews and Christians are charged with having altered; and indeed, few or none of the relations or circumstances in the Koran were invented by Mahomet, as is generally supposed, it being easy to trace the greatest part of them much higher, as the rest might be, were more of those books extant, and was it worth while to make the inquiry.

The rest of the Alcoran is taken up in prescribing necessary laws and directions, frequent admonitions to moral and divine virtues, the worship and reverence of the supreme being, and resignation to his will. One of their most learned commentators distinguishes the contents of the Alcoran into *allegorical* and *literal*; under the former are comprehended all the obscure, parabolical, and enigmatical passages, with such as are repealed, or abrogated; the latter, such as are clear, and in full force.

The most excellent moral in the whole Alcoran interpreters say, is that in the chapter *Al Araf*; viz. *Shew mercy, do good to all, and dispute not with the ignorant*; or, as Mr Sale renders it, *Use indulgence, com-*

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mand that which is just, and withdraw far from the ignorant. Mahomet, according to the authors of the *Kefchaf*, having begged of the angel Gabriel a more ample explication of this passage, received it in the following terms: "Seek him who turns thee out, give to him who takes from thee, pardon him who injures thee; for God will have you plant in your souls the roots of his chief perfections." It is easy to see, that this commentary is copied from the Gospel.—In reality, the necessity of forgiving enemies, though frequently inculcated in the Alcoran, is of a later date among the Mahometans than among the Christians; among those latter, than among the heathens; and to be traced originally among the Jews*. But it matters not so much who had it first, as who observes it best. The caliph Hassan, son of Hali, being at table, a slave unfortunately let fall a dish of meat reeking hot, which scalded him severely. The slave fell on his knees, rehearsing these words of the Alcoran, "Paradise is for those who restrain their anger." I am not angry with thee, answered the caliph. "And for those who forgive offences against them," continues the slave. I forgive thee, replies the caliph. "But above all, for those who return good for evil," adds the slave. I set thee at liberty, rejoined the caliph, and I give thee ten dinars.

* See Exod. xxxiii. 4, 5.

There are also a great number of occasional passages in the Alcoran, relating only to particular emergencies. For this advantage Mahomet had in the piecemeal method of receiving his revelation, that whenever he happened to be perplexed and gruelled with any thing, he had a certain resource in some new morsel of revelation. It was an admirable contrivance of his, to bring down the whole Alcoran at once, only to the lowest heaven, not to earth; since, had the whole been published at once, innumerable objections would have been made, which it would have been impossible for him to solve; but as he received it by parcels, as God saw fit they should be published for the conversion and instruction of the people, he had a sure way to answer all emergencies, and to extricate himself with honour from any difficulty which might occur.

That Mahomet was really the author and chief contriver of the Koran, is beyond dispute; though it is highly probable that he had no small assistance in his design from others, as his countrymen failed not to object to him: however, they differed so much in their conjectures as to the particular persons who gave him such assistance, that they were not able, it seems, to prove the charge; Mohammed, it is to be presumed, having taken his measures too well to be discovered.

However it be, the Mahometans absolutely deny the Koran was composed by their prophet himself, or any other for him. It is their general and orthodox belief, that it is of divine original; nay, that it is eternal and uncreated, remaining, as some express it, in the very essence of God: that the first transcript has been from everlasting by God's throne, written on a table of vast bigness, called the *preserved table*, in which are also recorded the divine decrees past and future: that a copy from this table, in one volume on paper, was by the ministry of the angel Gabriel sent down to the lowest heaven, in the month of Ramadan, on the night of *power*: from whence Gabriel revealed it to Mahomet by parcels, some at Mecca, and some at Medina,

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at different times, during the space of twenty-three years, as the exigency of affairs required; giving him, however, the consolation to shew him the whole (which they tell us was bound in silk, and adorned with gold and precious stones of paradise) once a-year; but in the last year of his life he had the favour to see it twice. They say, that few chapters were delivered entire, the most part being revealed piecemeal, and written down from time to time by the prophet's amanuensis in such a part of such or such a chapter, till they were completed, according to the directions of the angel. The first parcel that was revealed is generally agreed to have been the first five verses of the ninety-sixth chapter.

After the new-revealed passages had been from the prophet's mouth taken down in writing by his scribe, they were published to his followers, several of whom took copies for their private use, but the far greater number got them by heart. The originals, when returned, were put promiscuously into a chest, observing no order of time, for which reason it is uncertain when many passages were revealed.

When Mahomet died, he left his revelations in the same disorder, and not digested into the method, such as it is, in which we now find them. This was the work of his successor Abu Becr; who, considering that a great number of passages were committed to the memory of Mahomet's followers, many of whom were slain in their wars, ordered the whole to be collected, not only from the palm-leaves and skins on which they had been written, and which were kept between two boards or covers, but also from the mouths of such as had gotten them by heart. And this transcript, when completed, he committed to the custody of Hafsa the daughter of Omar, one of the prophet's widows.

From this relation it is generally imagined that Abu Becr was really the compiler of the Koran; though, for aught appears to the contrary, Mahomet left the chapters complete as we now have them, excepting such passages as his successor might add or correct from those who had gotten them by heart; what Abu Becr did else, being perhaps no more than to range the chapters in their present order, which he seems to have done without any regard to time, having generally placed the longest first.

However, in the thirtieth year of the Hegira, Othman being then caliph, and observing the great disagreement in the copies of the Koran in the several provinces of the empire; those of Irak, for example, following the reading of Abu Musa al Ashari, and the Syrians that of Maedad Ebn Afwad; he, by the advice of the *companions*, ordered a great number of copies to be transcribed from that of Abu Becr, in Hafsa's care, under the inspection of Zeid Ebn Thabet, Abd'allah Ebn Zobair, Said Ebn al As, and Ad'alrahman Ebn al Hareth the Makhzumite; whom he directed, that, wherever they disagreed about any word, they should write it in the dialect of the Koreish, in which it was at first delivered. These copies, when made, were dispersed in the several provinces of the empire, and the old ones burnt and suppressed. Though many things in Hafsa's copy were corrected by the abovementioned revisers, yet some few various readings still occur.

In fine, the book of the Alcoran is held in the highest esteem and reverence among the Musselmans. They dare not so much as touch the Alcoran, without being

first washed, or legally purified; to prevent which, an inscription is put on the cover or label, *Let none touch but they who are clean*. It is read with great care and respect; being never held below the girdle. They swear by it; take omens from it on all weighty occasions; carry it with them to war; write sentences of it in their banners; adorn it with gold and precious stones; and knowingly suffer it not to be in the possession of any of a different religion. Some say that it is punishable even with death, in a Christian, to touch it; others, that the veneration of the Musselmans leads them to condemn the translating it into any other language as a profanation: but these seem to be aggravations. The Mahometans have taken care to have their scripture translated into the Persian, the Javan, the Malayan, and other languages; though, out of respect to the original, these versions are generally, if not always, interlined.

See further concerning the history of the Alcoran, *Boulainvilliers*, Vie de Mahom. p. 258. Aët. Erudit. Lipf. 1694, p. 382. & 1692, p. 331, seq.—Its excellency and use, *Reland*, Relig. Mahom. in Pref. Jour. Liter. T. 10. p. 29.—Its Characters and Confusion, *Ouvr. des Scav. Sept. 1704*, p. 419. Jour. des Scav. T. 37. p. 39. 48. p. 87, T. seq.—Its Obscurity and Difficulties, *Mem. de Trev. 1714*, p. 1147.—Its Doctrine of Christ, *Phil. Trans. N° 154*, p. 433. See also *Poëstus* on its conformity with the Gospel.—Contradictions in it, how solved, *D' Herbel*, p. 87.

ALCORAN, is also figuratively applied to certain other books full of impieties and impostures.—In this sense we meet with the *Alcoran* of the Cordeliers, which has made a great noise; wherein St Francis is extravagantly magnified, and put on a level with Jesus Christ. The Alcoran of the Cordeliers is properly an extract of a very scarce book, entitled, The conformity of the life of the seraphic father St Francis with the life of Christ, published in 1510, 4to.; since, at Bologna, in folio. Erasmus Albertus, being by the elector of Brandenburg appointed to visit a monastery of Franciscans, found this book; and being struck with the extreme folly and absurdity of it, collected a number of curiosities out of it, and published them under the title of the *Alcoran* of the Franciscans, with a preface by Martin Luther.

ALCORANISTS, among Mahometans, those who adhere strictly to the letter or text of the alcoran, from an opinion of its ultimate sufficiency and perfection. The Persians are generally *Alcoranists*, as admitting the alcoran alone for their rule of faith. The Turks, Tartars, Arabs, &c. besides the alcoran, admit a multitude of traditions. The Alcoranists, among Mahometans, amount to much the same with the textualists among the Jews. The Alcoranists can find nothing excellent out of the alcoran; are enemies of philosophers, metaphysicians, and scholastic writers. With them the alcoran is every thing.

ALCOVE, among builders, a recess, or part of a chamber separated by an estrade, or partition of columns, and other corresponding ornaments, in which is placed a bed of state, and sometimes seats to entertain company. These alcoves are frequent in Spain; and the bed is raised two or three ascents, with a rail at the foot.

ALCUINUS (Flaccus,) an ecclesiastical of the eighth century. Where he was born, is a matter of dispute;

Alcoran

Alcuinus.

Alcyonius || **Aleyonius.** dispute; but, according to the most probable opinion, it was in Yorkshires. It is pretty certain, however, that he was educated first under Bede, and afterwards by Egbert archbishop of York, by whom he was made keeper of the library of that city (A). He thence rose to be deacon of the church, and afterwards became abbot of Canterbury. In the year 793 he went over to France, upon the invitation of Charlemagne, by whom he was greatly cared for, and amply provided for. He was not only honoured with his friendship and confidence, but became his instructor in rhetoric, logic, mathematics, and divinity. He attended him to the council of Francfort; and, at his return, was presented with the abbey of Ferrara, St Jodocus, and St Lupus. He retired at last to the abbey of St Martin at Tours, where he spent the latter part of his life, and died in the year 804. Doubtless, he was one of the best scholars and wisest men of his time. France was chiefly indebted to him for her improvements in literature. The universities of Paris, Tours, Fulden, Soissons, and many others, owe to him their origin and increase; and to him was owing the institution of learned academies, at least the first one * we read of was set on foot by the emperor at his instigation. His works were collected and published by Andrew du Chesne in one volume folio, Paris, 1617. They consist of, 1. Tracts upon scripture. 2. Tracts upon doctrine, discipline, and morality. 3. Historical treatises, letters, and poems. Since this edition, there has been published an incredible number of tracts, poems, &c. ascribed to this author, most of which, in all probability, were not his.

* See *Alcedo*.

† See *Alcedo*.

ALCYON, the trivial name of a species of alcedo †. **ALCYONIUM**, an obsolete name of a submarine plant. It is also used for a kind of coral, or alroites, frequently found fossil in England.

ALCYONIUS STAGNUM, (anc. geogr.) a lake in the territory of Corinth, whose depth was unfathomable, and in vain attempted to be discovered by Nero: through this lake Bacchus is said to have defended to hell, to bring back Semele; (Pausanias).

ALCYONIUS (Peter), a learned Italian, who flourished in the 16th century. He was well versed in the Greek and Latin tongues, and wrote some pieces of eloquence which met with great approbation. He was corrector of the press a considerable time for Aldus Manutius, and is intitled to a share in the praises given to the editions of that learned printer. He published a treatise concerning banishment, which contained so many fine passages intermixed with others quite the reverse, that it was thought he had tackled to somewhat of his own, several fragments of a treatise of *Cicero de gloria*; and that afterwards, in order to save himself from being detected in this theft, he burnt the manuscript of Cicero, the only one extant. Paulus Manutius, in his commentary upon these words of Cicero, "Librum tibi celeriter mittam de gloria, I will speedily send you my treatise on glory;" has the following passage relating to this affair: "He means (says he) his two books On Glory, which were handed down to the age of our fathers; for Bernard Justinian, in the index of his books, mentions *Cicero de Gloria*. This treatise however, when Bernard had left his whole

library to a nunnery, could not be found, though Aldborough sought after with great care: nobody doubted but Peter Alcyonius, who, being physician to the nunnery, was entrusted with the library, had basely stole it. And truly, in his treatise Of Banishment, some things are found interperled here and there, which seem not to favour of Alcyonius, but of some higher author." The two orations he made after the taking of Rome, wherein he represented very strongly the injustice of Charles V. and the barbarity of his soldiers, were excellent pieces. There is also an oration ascribed to him, on the knights who died at the siege of Rhodes.

ALDBOROUGH, a sea-port town in Suffolk, with a market on Saturdays. It is pleasantly situated, in a dale, between a high hill to the westward, on which its large old-built church stands; the sea to the east, and its river, running south-west. It is a large, long, ordinary town, made up of two or three streets of low houses, running parallel to each other. A quarter of a mile to the south lies Slaughden, where they have a commodious key, with warehouses for fish: more southerly still, they have conveniences for drying their north-sea fish. Their employment in the fishery is their chief business, which is considerable in the seasons for catching herrings and sprats; and it is the only place in England for curing red sprats. It is a town corporate, and sends two members to parliament. Towards the sea, it has some pieces of cannon planted for its defence. It is 88 miles north-east from London. E. Long. 1. 32. N. Lat. 52. 50.

ALDBOROUGH, a market-town in the west riding of Yorkshire, seated on the river Ouse, 15 miles north-west of York, and 200 miles north of London. It sends two members to parliament. W. Long. o. 20. N. Lat. 54. 15. It was anciently a Roman city, called *Isurium Brigantium*; and several coins and monuments of the Saxons and Romans have been discovered there.

ALDEBARAN, in astronomy, a star of the first magnitude, called in English the *bull's-eye*, as making the eye of the constellation Taurus. Its longitude is 6 deg. 32 min. 9 sec. of Gemini, and its latitude 5 deg. 29 min. 40 sec. south.

ALDER-TREE, in botany. See *ALNUS*.

ALDERHOLM, a pleasant island of Sweden, formed by the three arms of a river running thro' Gentle, a town of Norland, in Sweden. Here is a wharf, a repository for planks and deals, two packing houses, a large custom-house for taking toll of the ships, an arsenal for cannon, and a granary.

ALDERMAN, in the British policy, a magistrate subordinate to the lord-mayor of a city or town-corporate. The number of these magistrates is not limited, but is more or less according to the magnitude of the place. In London they are 26; each having one of the wards of the city committed to his care. This office is for life; so that when one of them dies, or resigns, a ward-mote is called, who return two persons, one of whom the lord-mayor and aldermen chuse to supply the vacancy. By the charter of the city of London, all the aldermen who have been lord-mayors, together with the three eldest ones not arrived at that dignity, are justices of the peace.

D d 2

ALDERMAN,

(A) William of Malmesbury calls this library *omnium liberalium artium armarium*. It was destroyed by fire in the reign of king Stephen, with great part of the city of York.

Alderman
Aldhelm.

ALDERMAN, among our Saxon ancestors, was a degree of nobility answering to earl or count at present.

ALDERMAN was also used, in the time of king Edgar, for a judge or justice; in which sense, Alwin is called *aldermannus totius Angliæ*.

ALDERNEY, an island in the British channel, subject to the crown of Great Britain. It is about eight miles in compass, and is separated from Cape la Hogue, in Normandy, by a narrow freight, called the *Race of Alderney*, which is a very dangerous passage in stormy weather when the two currents meet; otherwise it is safe, and has depth of water for the largest ships. Thro' this freight the French fleet made their escape, after their defeat at La Hogue, in 1692. It is a healthy island, has but one church, is fruitful both in corn and pasture, and is remarkable for a fine breed of cows. The inhabitants, for their greater safety, live together in a town of the same name. The number of houses are said to be 200, and the inhabitants 1000. It has but one harbour, called *Crabby*, which is at a good distance from the town; and is only fit for small vessels. To the west lie the range of rocks called the *Caſkets*, so dangerous to mariners. W. Long. 2. 17. N. Lat. 49. 50.

ALDHELM (St.), bishop of Shireburn in the time of the Saxon Heptarchy. He is said to have been the son of Kenred, brother to Ina, king of the West-Saxons; but, in the opinion of William of Malmesbury, his father was no more than a distant relation to the king. He was born and educated at Malmesbury in Wiltshire; where he built a monastery, of which he himself was the first abbot. He was afterwards, in 705, by king Ina, promoted to the see of Shireburn, and consecrated at Rome by Pope Sergius I. whom he is said to have reproved for his incontinency. He was the first Englishman who wrote in Latin, and the first who introduced Latin poetry into this island. Bale gives him also the character of a skilful musician. According to the monkish writers, he wrought many miracles. He died May 25th, 709. Malmesbury says, that he might be justly deemed *ex acumine Græcum, ex nitore Romanum, et ex pompa Anglum*. And an ancient chronicler says, that he was an excellent harper, a most eloquent Saxon and Latin poet, a most expert chanter or singer, *doctor egregius*, and admirably well versed in the scriptures and the liberal sciences. Bede says of Aldhelm, that "he was a man of universal erudition, having an elegant style, and being wonderfully well acquainted with books." In fact, considering the cloud of ignorance by which he was surrounded, and the great difficulty of acquiring knowledge without proper instruction, Aldhelm was a very extraordinary man. From one of his letters to Hedda, bishop of Winchester, concerning the nature of his studies whilst at Canterbury, he appears to have been indefatigably determined to acquire every species of learning in his power. For a copy of this curious epistle, see Henry's History, vol. i. p. 318.—He wrote, 1. *De octo vitiiis principalibus*. This treatise is extant in *Bibliotheca Patrum* of Canisius. 2. *Ænigmatum versus mille*. This, with several other of his poems, was published by Martin Delrio at Mentz, 8vo, 1601. 3. A book addressed to a certain king of Northumberland, named Aldif, on various subjects. 4. *De vita monachorum*. 5. *De laude sanctorum*. 6. *De arithmetica*. 7. *De astrologia*. 8. A book against the mi-

stake of the Britons concerning the celebration of Easter; printed by Sonius, 1576. 9. *De laude virginis*. Manuscript, in Bennet-college, Cambridge. Published among Bede's *Opuscula*. Besides many sonnets, epistles, and homilies in the Saxon language.

ALDPORT, an ancient name for Manchester *.

ALDRICH (Robert), bishop of Carlisle, was born at Burnham in Buckinghamshire about the year 1493, and educated at Eaton-school; from whence, in 1507, he was elected scholar of King's-college, Cambridge, where he took his degrees in arts, and was afterwards proctor of the university. In 1525, he was appointed master of Eaton-school, then became fellow of that college, and finally provost. In 1529, he went to Oxford, where, being first incorporated bachelor of divinity, in the following year he proceeded doctor in that faculty; in 1531, he was made arch-deacon of Colchester; in 1534, canon of Windsor; and the same year, regent of the order of the garter. He was consecrated bishop of Carlisle in the year 1537, and died at Horncastle in Lincolnshire in 1556. He wrote, 1. *Epistola ad Gul. Hormannum*, in Latin verse; printed in Horman's *Antihiscon*, Lond. 1521, of which book Pitts erroneously makes Aldrich the author. 2. *Epigrammata varia*. 3. *Latin verses, and another epistle to Horman*, prefixed to the *Vulgaria puerorum* of that author, Lond. 1519, 4to. 4. *Answers to certain queries concerning the abuses of the mass*; also about receiving the sacrament.

ALDRICH (Dr Henry), an eminent English divine and philosopher, born at London in 1647, was educated at Westminster school under the famous Dr Busby, and admitted of Christ-church college, Oxford. He had a great share in the controversy with the Papists in the reign of James II. and bishop Burnet ranks him among those who examined all the points of popery with a solidity of judgment, clearness of argument, depth of learning, and vivacity of writing, far beyond any who had before that time written in our language. He rendered himself so conspicuous, that at the revolution, when Masey the popish dean of Christ-church fled, his deanry was conferred on him. In this station he behaved in an exemplary manner; and that fabric owes much of its beauty to his ingenuity: it was Aldrich who designed the beautiful square called *Peckwater-Quadrangle*, which is esteemed an excellent piece of architecture. In imitation of his predecessor Dr Fell, he published, yearly, a piece of some ancient Greek author, as a present to the students of his house: he published *A System of Logic*, with some other pieces; and the revising Clarendon's History of the Rebellion, was intrusted to him and bishop Spratt. He died about the year 1711.

ALDROVANDUS (Ulysse), professor of philosophy and physic at Bologna, the place of his nativity. He was a most curious inquirer into natural history, and travelled into the most distant countries on purpose to inform himself of their natural productions. Minerals, metals, plants, and animals, were the objects of his curious researches; but he applied himself chiefly to birds, and was at great expence to have figures of them drawn from the life. Aubert le Mire says, that he gave a certain painter, famous in that art, a yearly salary of 200 crowns, for thirty years and upwards; and that he employed at his own expence Lorenzo Bennini and

Aldport
Aldrovandus.

* See Manchester.

Aldro-
vandus
Ale.

and Cornelius Swintus, as well as the famous engraver Christopher Coriolanus. These expences ruined his fortune, and at length reduced him to the utmost necessity; and it is said that he died blind in an hospital at Bologna, at a great age, in 1605. Mr Bale observes, that antiquity does not furnish us with an instance of a design so extensive and so laborious as that of Aldrovandus, with regard to natural history; that Pliny has treated of more kinds of subjects, but only touches lightly on them, saying but a little upon any thing, whereas Aldrovandus has collected all he could meet with. His compilation, or that compiled upon his plan, consists of thirteen volumes in folio, several of which were printed after his death. He himself published his Ornithology, or History of Birds, in three folio volumes, in 1599; and his seven books Of Insects, which make another volume of the same size. The volume Of Serpents, three Of Quadrupeds, one Of Fishes, that Of exanguinous Animals, the History of Monsters, with the Supplement to that of Animals, the treatise Of Metals, and the Dendrology or History of Trees, were published at several times after the death of Aldrovandus, by the care of different persons; and Aldrovandus is the sole author only of the first six volumes of this work, the rest having been finished and compiled by others, upon the plan of Aldrovandus: a most extensive plan, wherein he not only relates what he has read in naturalists, but remarks also what historians have written, legislators ordained, and poets feigned: he explains also the different uses which may be made of the things he treats of, in common life, in medicine, architecture, and other arts; in short, he speaks of morality, proverbs, devices, riddles, hieroglyphics, and many other things which relate to his subject.

ALDROVANDA, in botany, a genus of the pentandria order, belonging to the pentagynia class of plants; of which there is but one species. The calix is divided into five parts; the petals are five; and the capsule has five valves, with ten seeds. It is a native of Italy and the Indies; and has no English name.

ALDUABIS, (anc. geogr.) a river of Celtic Gaul, which rising from mount Jura, separating the Sequani from the Helvetii, and running through the county of Burgundy, or the Franche Comté, environs almost on every side the city of Besançon; and running by Dole, falls into the Saône near Chalons. In Cæsar it is called *Alduafubis*; (in Ptolemy), *Dabis*; now *le Doux*.

ALE, a fermented liquor obtained from an infusion of malt, and differing from beer chiefly in having a less proportion of hops*. This liquor, the natural substitute of wine in such countries as could not produce the grape, was originally made in Egypt, the first planted kingdom, on the dispersion from the east, that was supposed unable to produce grapes. And, as the Noachian colonies pierced further into the west, they found, or thought they found, the same defect; and supplied it in the same manner. Thus the natives of Spain, the inhabitants of France, and the aborigines of Britain, all used an infusion of barley for their ordinary liquor; and it was called by the various names of *Calia* and *Ceria* in the first country, *Cerevisia* in the second, and *Gurmi* in the last; all literally importing only the *strong water*.

There are various sorts of ale known in Britain, particularly *pale* and *brown*: the former is brewed from

malt slightly dried; and is esteemed more viscid than the latter, which is made from malt more highly dried or roasted.

Pale ale brewed with hard waters, as those of springs and wells, is judged the most wholesome, in regard the mineral particles tend to prevent the cohesions of those drawn from the grain, and enable them to pass the proper secretions the better; softer waters, as those of rivers, and rain, seem better suited to draw out the substance of high-dried malts, which retain many igneous particles, best absorbed in a smooth vehicle.

In Staffordshire, they have a secret of fining ale, in a very short time. Plot conjectures it to be done by adding alum, or vinegar, in the working.

Ale is prepared various ways, and of various ingredients, as of wheat, rye, millet, oats, barley, the berries of the quick-bean, &c.

Some have found that the juice which bleeds from the birch or sycamore, is of great use on this occasion, applied instead of water. It makes one bushel of malt go as far as four in the common way.

Some have a method of preparing ale, so that it will keep, carried to the East or West Indies. The secret is, by mashing twice with fresh malt; boiling twice; and, after shipping it, putting to every five gallons two new-laid eggs whole, to remain therein. It is said, that, in a fortnight's time, the shells will be dissolved; and the eggs become like wind-eggs; and that afterwards the white would disappear, and the yoke remain untouched. Phil. Trans. No xxvii.

Ale is generally held to be more diuretic than beer, in regard it is smoother, more softening, and relaxing; so that where urine is to be promoted by facilitating the passage, ale is most likely to effect it.

Ale is flatulent; and hence sometimes produces colics, and the cholera morbus: it is acceft; but it does not produce calcareous diseases, as has been asserted.

If malt-liquor, of any degree of strength, is become flat and tartish, as it is used, it should be drawn out of the cask into a jug, in which as many drams of powdered chalk is put as there are to be pints of liquor; thus a new ferment will be raised, a sprightly taste will be restored to the liquor, and its acidity will be destroyed. Tart liquors of this kind are apt to produce a dysury, strangury, or a gonorrhœa; in which cases, a small quantity of brandy may be taken.

The consumption of ale in these kingdoms is incredible. It was computed twenty years ago at the value of four millions yearly, including Great Britain and Ireland.

Medicated ALES, those wherein medicinal herbs have been infused, or added during the fermentation*.

Gill ALE, is that in which the dried leaves of gill or ground-ivy have been infused. It is esteemed astringent and vulnerary, and consequently good in disorders of the breast and obstructions of the viscera. Pharmaz. No 381, &c.

ALE-conners, an officer in London, who inspects the measures used in public-houses. There are four ale-conners, who are all chosen by the common-council of the city.

ALE-silver, a tax paid annually to the lord-mayor of London, by all who sell ale within the city.

ALEA, in Roman antiquity, denotes in general all manner of games of chance; but, in a more restricted sense,

Ale
Alea.

* See Brew-
ing.

* See

Pharmacy.

Alexander
Alectoromantia.

sense, was used for a particular game played with dice and tables, not unlike our backgammon.

ALEXANDER (Jerome), cardinal and archbishop of Brindisi, was born in 1480; and distinguished himself at the beginning of the reformation, by the opposition he made to Luther: for being sent into Germany as the pope's nuncio in 1519, he acted, as occasion served, in the character both of ambassador and doctor; and declaimed three hours together against Luther's doctrine before the diet of Worms, but could not prevent that celebrated reformer from being heard in that diet. He published several works, and died at Rome in 1542.

ALEXANDER (Jerome), a learned man of the seventeenth century, born in the principality of Friuli, of the same family with the preceding. When he went to Rome, he was employed as secretary under cardinal Octavius Bandini, and discharged this office with great honour for almost twenty years. He afterwards, by the persuasion of Urban VIII. who had a great esteem for him, became secretary to Cardinal Barberini, whom he accompanied to Rome when he went there in the character of legate *a latere*, and in whose service he died in 1631. He was one of the first members of the academy of Humorists, wrote a learned treatise in Italian on the device of the society, and displayed his genius on many different subjects. Barberini gave him a magnificent funeral at the academy of Humorists; the academists carried his corpse to the grave; and Gaspar Simeonibus, one of the members, made his funeral oration.

ALECTO, one of the furies, daughter of Acheron and the Night, or, as others would have it, of Pluto and Proserpine.

ALECTORIA, a stone said to be formed in the gall-bladders of old cocks, to which the ancients ascribed many fabulous virtues. This is otherwise called *Alectorius Lapis*, sometimes *Alectorolithos*, in English the *cock-stone*. The more modern naturalists hold the *alectorius lapis* to be originally swallowed down, not generated in, the stomach or gizzard of cocks and capons. It is known that many of the fowl-kind make a practice of swallowing pebbles, as it is supposed to be of service in the business of trituration and digestion.

ALECTOROMANTIA, in antiquity, a species of divination performed by means of a cock. This is otherwise called *Aletrymancy*; of which there appear to have been different species. But that most spoken of by authors was in the following manner: A circle being described on the ground, and divided into twenty-four equal portions, in each of these spaces was written one of the letters of the alphabet, and on each of the letters was laid a grain of wheat; after which, a cock being turned loose in the circle, particular notice was taken of the grains picked up by the cock, because the letters under them, being formed into a word, made the answer desired. It was thus, according to Zonaras, that Libanius and Jamblicus fought who should succeed the emperor Valens; and the cock eating the grains answering to the spaces ΘΕΟΔ, several whose names began with those letters, as Theodotus, Theodistes, Theodulus, &c. were put to death; which did not hinder, but promote, Theodosius to the succession. But the story, however current, is but ill supported: It has been called in question by some, and refuted by others, from the silence of Marcellinus,

Socrates, and other historians of that time.

A-LEE, in the sea-language, a term only used when the wind, crossing or flanking the line of a ship's course, presses upon the masts and falls so as to make her incline to one side, which is called the lee-side: hence, when the helm is moved over to this side, it is said to be *a-lee*, or *hard-a-lee*.

ALEGAMBE (Philip), a celebrated Jesuit, born at Brussels in 1592, distinguished himself by publishing a Bibliothecque of the writers of his order, and died at Rome in 1652.

ALEGRETTE, a small town of Portugal, in Alentejo, on the confines of Port Alegre, on the river Caja, which falls into the Guadiana, a little below Badajoz, near the frontiers of Spanish Estremadura. It is a very pretty town, and finely situated; seven miles south-east of Port Alegre, and thirty north of Elvas. W. Long. 5. 20. N. Lat. 39. 6.

ALEIUS CAMPUS, in ancient geography, (Homer, Strabo, Pliny); a plain in Cilicia, on this side the river Pyramus, near the mountain Chimera, famous for Bellerophon's wandering and perishing there, after being thrown off Pegasus; which is the reason of the appellation.

ALEMANIA, or ALLEMANIA, (anc. geog.) a name of Germany, but not known before the time of the Antonines, and then used only for a part. After the Marcomanni and their allies had removed from the Rhine, a rabble, or collection of people from all parts of Gaul, as the term *Alemanni* denotes, prompted either by levity or poverty, occupied the Agri, called *Decumates* by Tacitus, because they held them on a tithe; now supposed to be the duchy of *Wurtemberg*. Such appear to be the small beginnings of Alemania, which was in after-times greatly enlarged: but still it was considered as a distinct part; for Caracalla, who conquered the Alemanni, assumed the surname both of *Alemannicus* and *Germanicus*.

ALEMBIC, a chemical vessel, usually made of glass, or copper, for condensing the vapours that rise in distillation; for the alembic is properly the head or upper part of the apparatus used in distilling; though it is often used to signify the whole. See DISTILLING.

ALEMBROTH, in the writings of the alchemists, a word used for a sort of fixed alkaline salt, which had the power of the famous alkali, in dissolving bodies, opening the pores of most or all known substances, and thence, as well as by destroying sulphurs, promoting the separation of metals from their ores.—It is also used for a compound of corrosive mercury and sal ammoniac. See CHEMISTRY, n° 337.

ALENIO (Julius), a Jesuit, born at Brescia in the republic of Venice. He travelled into the eastern countries; and arrived at Maca in 1610, where he taught mathematics. From thence he went to the empire of China, where he continued to propagate the Christian religion for thirty-six years. He was the first who planted the faith in the province of Xansi, and he built several churches in the province of Fokien. He died in August 1649, leaving behind him several works in the Chinese language.

ALENTEJO, a province of Portugal, between the rivers of Tajo and Guadiana: the soil is very fertile, and the inhabitants laborious and indutrious. The principal town is Eborá.

A-lee
Alentejo.

Alençon,
Aleppo.

ALENZON, a large handsome town of France, in lower Normandy, with the title of a duchy. It is surrounded with good walls, and flanked with towers. The castle was formerly a place of great consequence, and has held out long sieges. It has but one parish-church, which has a bold and noble front. Among the nurseries, that of St Clair is most remarkable. It is seated on the river Sarthe, in a vast open plain, which produces all sorts of corn and fruit. Near it there are quarries of stone fit for building, wherein are found a sort like Bristol stones. The linen made at Alençon is very good, and sells at Paris. It is 20 miles north of Mans, 63 south-by-west of Rouen, and 88 south-west of Paris. Lon. $0. 10. N.$ lat. $48. 25.$

ALEPPO, or **HALEB**, the metropolis of Syria, is built on eight small hills or eminences, on the highest of which the castle is erected, and is now generally agreed to be the ancient Berzæ. This mount is of a conic form, and seems in a great measure to be raised with the earth thrown up out of a deep broad ditch which furrounds it. The suburbs to the north-north-east are next in height to this, and those to the west-south-west are much lower than the parts adjacent and than any other part of the city. It is encompassed by an old wall considerably decayed, and by a broad ditch now in most places turned into gardens. It is about three miles and a half in circumference, but the suburbs eight.

The mosques in Aleppo are numerous, and some few of them magnificent. Before each of them is an area, with a fountain in the middle, designed for ablutions before prayers; and behind some of the larger there are little gardens. There are many large khans, or caravanseras, consisting of a capacious square, on all sides of which are a number of rooms, built on a ground-floor, used occasionally for chambers, ware-houses, or stables. Above stairs there is a colonade or gallery on every side, in which are the doors of a number of small rooms, wherein the merchants, as well strangers as natives, transact most of their business. The streets are narrow; but well paved, and kept very clean.

The bazars or market-places are long covered narrow streets, on each side of which are a great number of small shops, just sufficient to hold the tradesman and his goods, the buyer being obliged to stand without. Each separate branch of business has a particular bazar, which is locked up, as well as the streets, an hour and a half after sun-set: but the locks are of wood, though the doors are cased with iron. The slaughter-houses are in the suburbs, open to the fields. The tanners have a khan to work in near the river. To the southward in the suburbs they burn lime, and a little beyond that there is a village where they make ropes and catgut. On the opposite side of the river, to the westward, there is a glass-house, where they make a coarse white glass, in the winter only, for the greatest part of this manufacture is brought from a village thirty-five miles westward.

The city is supplied with good water from springs, near the banks of the river Heylen, about five miles to the north-east, which is conveyed from thence by an aqueduct, and distributed all over the town by earthen pipes. This is sufficient for drinking, cookery, &c. but the fountains are supplied by wells of brackish water, of which there is one in every house. Their

fuel is wood and charcoal in the house; but they treat their bagnios with the dung of animals, leaves of plants, parings of fruit, and the like.

The inhabitants of Aleppo, though of different religions, seem to be much the same sort of people. The number of souls in the city and suburbs is computed at about 235,000, of whom 200,000 are Turks, 30,000 Christians, and 5000 Jews. Of the Christians the greater number are Greeks, next to them the Armenians, then the Syrians, and lastly the Maronites; each of whom have a church in the city called *Judidah*, in which quarter, and the parts adjacent, most of them reside. The common language is the vulgar Arabic, but the Turks of condition use the Turkish. Most of the Armenians can speak the Armenian, some few Syrians understand Syriac, and many of the Jews Hebrew; but scarce one of the Greeks understand a word of Greek: however, in their manners, they all are much alike. Aleppo is 70 miles east of Scanderoun, on the sea-coast, and 175 north-by-east of Damascus. E. long. $37. 40. N.$ lat. $36. 12.$

ALERIA, **ALALIA**, or **ALARIA**, (anc. geog.) a town of Corica, situated near the middle of the east side of the island, on an eminence, near the mouth of the river Rotanus mentioned by Ptolemy; built by the Phœceans, (Diodorus Siculus.) Afterwards Sylla made a colony thither. It is now in ruins, and called *Aleria Distrutta*.

ALES (Alexander), a celebrated divine of the confession of Augsbourgh, born at Edinburgh the 23d of April 1500. He soon made a considerable progress in school-divinity, and entered the lists very early against Luther, this being then the great controversy in fashion, and the grand field wherein all authors young and old used to display their abilities. Soon after, he had a share in the dispute which Patrick Hamilton maintained against the ecclesiastics, in favour of the new faith he had imbibed at Marpurg: he endeavoured to bring him back to the Catholic religion; but this he could not effect, and even began himself to doubt about his own religion, being much affected by the discourse of this gentleman, and still more by the constancy he shewed at the stake, where David Becon archbishop of St Andrew's caused him to be burnt. Beginning thus to waver, he was himself persecuted with so much violence, that he was obliged to retire into Germany, where he became at length a perfect convert to the Protestant religion. The change of religion which happened in England after the marriage of Henry VIII. with Anna Bullen, induced Ales to go to London, in 1535. He was highly esteemed by Cranmer archbishop of Canterbury, Latimer, and Thomas Cromwel, who were at that time in high favour with the king. Upon the fall of these favourites, he was obliged to return to Germany; where the elector of Brandenburg appointed him professor of divinity at Francfort upon the Oder, in 1540. But leaving this place upon some disgust, he returned to Leipsic, where he was chosen professor of divinity, and died in March 1565. He wrote a Commentary on St John, on the Epistles to Timothy, and on the Psalms, &c.

ALESA, **ALÆSA**, or **HALESA**, (anc. geogr.) a town of Sicily, on the Tuscan sea, built, according to Diodorus Siculus, by Archonides of Herbita, in the second year of the ninety-fourth olympiad, or four hundred

Aleppo
||
Alefa.

Alexham
Alexander.

dred and three years before Christ; situated on an eminence about a mile from the sea: now in ruins. It enjoyed immunity from taxes under the Romans, (Diodorus, Cicero.) The inhabitants were called *Halefni*, (Cicero, Pliny); also *Alfesi*, and *Alefni*.

ALESHAM, a small neat town in Norfolk. It is 15 miles N. of Norwich, and 121 N. E. by N. of London. E. Long. o. 30. N. Lat. 52. 53. The town consists of about 400 pretty good houses; but the streets are narrow, though well paved.

ALESIA, (anc. geog.) called *Alexia* by Livy and others; a town of the Mandubii, a people of Celtic Gaul; situated, according to Cæsar, on a very high hill, whose foot was washed on two sides by two rivers. The town was of such antiquity, that Diodorus Siculus relates it was built by Hercules. It is supposed to be the city of *Alise*, in the duchy of Burgundy, not far from Dijon.

ALET, a town of France, in Lower Languedoc, with a bishop's see. It is remarkable for its baths, and for the grains of gold and silver found in the stream which runs from the Pyrenean mountains, at the foot of which it stands. It is feated on the river Aude, 15 miles S. of Carcassone, and 37 N. W. of Narbonne. E. Long. 2. 56. N. Lat. 42. 59.

ALETRIS, in botany, a genus of the monogynia order, belonging to the hexandria class of plants. Of this genus, botanical writers enumerate five species, viz. 1. The farinosa, a native of Virginia, and other parts of North America. 2. The capensis, a native of the Cape of Good Hope. 3. The hyacinthoides, or Guinea aloe. 4. The zeylanica, or Ceylon aloe. 5. The fragrans, or tree-aloe, a native of Africa. Of these only the first is so hardy as to outlive the winter in Britain, unless placed in a stove; and even this requires to be sheltered under a frame. The flowers appear in June or July, of a whitish green colour. The third and fifth produce fine spikes of white flowers; those of the third kind appearing in July, of the fifth in March or April. By proper management the last kind becomes a stately plant, rising to the height of twelve or fourteen feet; the flowers open wide in the evening, and perfume the air of the stove. These send out one or two heads, or tufts, towards their tops; which may be cut off; and after they have lain a week in the stove to heal the wounded parts, they may be planted for increase. The other species seldom or never flower in this country, nor does their appearance otherwise merit notice.

ALETUM, or ALETA, (anc. geogr.) a town of Celtic Gaul, now extinct. From its ruins arose St Malo, in Brittany, at the distance of a mile. Its ruins are called *Guich Aleth* in the British.

ALEXANDER THE GREAT, king of Macedonia. His father Philip laid the plan of that extensive empire, which his son afterwards executed.—Philip, having made himself master of Greece, began to cast his eyes upon Persia, with a view to retaliate upon that haughty empire the injuries of former times. It was the popular topic of the day. But this prince was cut off in the midst of his enterprise. Such, however, was the influence of Alexander in the assembly of the Grecian states, that he was created general of their combined forces in the room of his father. Having made every needful preparation, at the head of a veteran army he invaded Asia. The lieutenants of Darius,

Alexander.

who was then king of Persia, opposed him at the river Granicus, where Alexander obtained a complete victory, after which he pursued his march through Asia. At Issus, near Scanderoon, he was met by Darius in person, at the head of a prodigious army. Here he obtained a second victory; and took the camp of Darius, together with his family, whom he treated with the utmost humanity. Contrary to all the maxims of war, instead of pursuing Darius, he made an excursion into Egypt; and, as far as appears, through no better motives than those of vanity. Here he was acknowledged to be the son of Jupiter Ammon. In the mean time Darius recruited his strength, and got together an army superior to what he brought into the plain of Issus. Alexander having finished his Egyptian expedition, traversed Asia, and passed the Euphrates. At Arbella, a town in Assyria, he met Darius. Here a decisive battle was fought, which put all Persia into the hands of Alexander. His ambition not being satisfied with the conquest of that vast country, he projected an expedition into India. Here he met with great opposition from Porus, a gallant prince, whom in the end he reduced. Beyond the Ganges lay a country still unsubdued. He notified it to his army, that he proposed to pass the river. But these veterans, harassed with the fatigues, and seeing no end of their labour, mutinied, and refused to march further. The disappointed chief was therefore obliged to return. At Babylon he proposed to receive ambassadors, appoint governors, and settle his vast monarchy; but his excesses put an end to his life in the midst of his designs, and in the flower of his age.—Alexander had a noble education under Aristotle, and other masters of the first eminence; the good effects of which were seen in the early part of his life. No prince ever gave nobler instances of generosity, candour, justice, prudence, and fortitude. But the tide of his successes changed his manners; and he became luxurious, arrogant, cruel, and even brutal. With regard to his public character, he hath been as much the subject of different opinions, as any prince of antiquity. By some, his conquest of Persia has been considered as the greatest effort of heroism. His Indian expedition has likewise been magnified as an appendage to one vast plan of universal commerce and legislation. But they seem to have a truer idea of Alexander, who consider the whole scheme of his conquests as the project solely of ambition.

ALEXANDER AB ALEXANDRO, a Neapolitan lawyer, of great learning, who flourished towards the end of the 15th and beginning of the 16th century. He followed the profession of the law first at Naples, afterwards at Rome: but he devoted all the time he could spare to the study of polite literature; and at length he entirely left the bar, that he might lead a more easy and agreeable life with the muses. The particulars of his life are to be gathered from his work intitled *Genialium Dierum*: We are there informed, that he lodged at Rome, in a house that was haunted; and he relates many surprising particulars about the ghost: he says also, that, when he was very young, he went to the lectures of Philophrus, who explained at Rome the Tusculan questions of Cicero; he was there also when Nicholas Perot and Domitius Calderinus read their lectures upon Martial. The particular time when he died is not known; but he was buried in the monastery

of

Alexander. of the Olivets. Tiraqueau wrote a learned commentary upon his work, which was printed at Lyons in 1587, and reprinted at Leyden in 1673, with the notes of Dennis Godfrey, Christopher Colerus, and Nicholas Mercerus.

ALEXANDER SEVERUS, emperor of Rome, succeeded Heliogabalus about A. D. 222, when but 16 years of age. His mother's name was Mammæa, and by her advice he in a great measure regulated his conduct. He applied himself to the reformation of abuses, the state having been greatly disordered by the vicious conduct of his predecessor; he was a most strict lover of justice, an encourager of learning and learned men, and favourable to the Christians. He made a successful expedition against the Persians; but endeavouring to reform his troops, which had grown very licentious under the late bad government, they murdered him at the instigation of Maximinus in the 29th year of his age, together with his mother, A. D. 235.

ALEXANDER VI. (Pope), had four bastards when he was cardinal, for one of which he had so great affection that he stuck at nothing to raise him. Desiring to poison some cardinals, he was poisoned himself, A. D. 1503. See BORGIA.

ALEXANDER VII. (Pope), whose real name was Fabio Chigi, was born at Sienna in 1599. His family finding him a hopeful youth, sent him early to Rome, where he soon engaged in a friendship with the marquis Pallavicini, who recommended him so effectually to Pope Urban VIII. that he procured him the post of Inquisitor at Malta. He was sent Vice-legat to Ferrara, and afterward nuncio into Germany: there he had an opportunity of displaying his intriguing genius; for he was mediator at Munster, in the long conference held to conclude a peace with Spain. Cardinal Mazarin had some resentment against Chigi, who was soon after made a cardinal and secretary of state by Innocent X. but his resentment was sacrificed to political views. In 1655, when a pope was to be chosen, Cardinal Sacchetti, Mazarin's great friend, finding it was impossible for him to be raised into St Peter's chair because of the powerful opposition made by the Spanish faction, desired Cardinal Mazarin to consent to Chigi's exaltation. His request was granted, and he was elected pope by the votes of all the 64 cardinals who were in the conclave: an unanimity of which there are but few instances in the election of popes. He shewed uncommon humility at his election, and at first forbade all his relations to come to Rome without his leave; but he soon became more favourable to his nephews, and loaded them with favours. It is asserted that he had once a mind to turn Protestant. The news-papers in Holland bestowed great encomiums upon him; and acquainted the world, that he did not approve of the cruel persecutions of the Waldenses in Piedmont. There is a volume of his poems extant. He loved the *Belles-Lettres*, and the conversation of learned men. He was extremely fond of stately buildings; the grand plan of the college *Della Sapienza*, which he finished, and adorned with a fine library, remains a proof of his taste in architecture. He died in 1667.

ALEXANDER (William), earl of Stirling, an eminent Scots statesman and poet in the reigns of James I. and Charles I. who, after travelling with the duke of Argyll as his tutor or companion, wrote a poetical com-

plaint of his unsuccessful love of some beauty, under the title of *Aurora*. He then removed to the court of James VI. where he applied to the more solid parts of poetry, forming himself upon the plan of the Greek and Roman tragedians. In 1607, he published some dramatic performances, intitled *The Monarchic Tragedie*, dedicated to king James; who was so well pleased with them, as to call him his philosophical poet. After this, he is said to have written *A supplement* to complete the third part of Sir Philip Sidney's *Arcadia*; and in 1613, he produced a poem called *Doomsday, or the great day of judgment*. He was made gentleman-usher to prince Charles, and master of the requests; was knighted; and obtained a grant of Nova Scotia, where he projected the settlement of a colony, but afterward sold it to the French. In 1626, he was made secretary of state for Scotland; was created first viscount, and then earl, of Stirling; and died in 1640.

ALEXANDER I. (St), whom St Ireneus reckons the fifth bishop of Rome, succeeded St Evaristus in the year 109, and died in the year 119. There is no account of his life; and the epistles which are attributed to him are supposititious.

ALEXANDER II. king of Scotland, succeeded his father William in 1213, at 16 years of age. He made an expedition into England, to oppose the tyranny of king John; who returned the visit, and was offered battle by Alexander, but refused it. He took the city of Carlisle from Henry III. which was afterwards exchanged for Berwick. Alexander died in 1249, in the 51st year of his age, and 35th of his reign; and left for his successor, his son—

ALEXANDER III. who was crowned king of Scotland in 1249. The Cummings, lords of Scotland, took arms against him; and taking him prisoner, confined him at Striveling; but he was afterwards released by his subjects. He married the daughter of Henry III. king of England; and was at length killed by a fall from his horse, on the 10th of April 1290, after having reigned 42, or according to others 37, years.

ALEXANDERS, in botany. See SMYRNIVUM.

ALEXANDREA, (anc. geogr.) a mountain of Mylla, on the sea-coast, forming a part of mount Ida, where Paris gave judgment on the three goddesses.

ALEXANDRETTA, by the Turks called *Scanderoun*; a town in Syria, at the extremity of the Mediterranean sea. It is the port of Aleppo, from which it is distant 28 or 30 leagues. It is now little else but a heap of ruined houses, chiefly inhabited by Greeks, who keep tipping-houses for sailors. The air is very unwholesome; and therefore the better sort of inhabitants, during the hot weather, live at a village called *Bayland*, on a mountain about ten miles off, where there is wholesome water and excellent fruit. What surprises strangers most, when they arrive at this place, are the pigeons which carry letters to Aleppo, which they reach in about three hours: these pigeons are of a singular kind *, and are very much celebrated * See Colum. throughout the east. E. Long. 37. 5. N. Lat. 36. 35. ^{b. u.}

ALEXANDRIA, now *Scanderia*, by Athenæus called *Ægyptus*; a city of Lower Egypt, and for a long time its capital. This city was built by Alexander the Great, soon after the overthrow of Tyre, about 333 years before Christ. It is situated on the Mediterranean, twelve miles west of that mouth of the Nile

E c anciently

Alexander
II
Alexandria.

Alexandria, anciently called *Canopicum*; and lies in E. long. 30. 19. N. lat. 31. 10.

Alexander is said to have been induced to build this city, on account of its being conveniently situated for a fine port; and so sudden was his resolution, that after he had directed where every public structure was to be placed, fixed the number of temples, and the deities to whom they should be dedicated, &c. there were no instruments at hand proper for marking out the walls, according to the custom of those times. Upon this, a workman advised the king to collect what meal was among the soldiers, and to sift it in lines upon the ground, whereby the circuit of the walls would be sufficiently marked out. This advice was followed; and the new method of marking out the walls was, by Aristander, the king's soothsayer, interpreted as a preface of the city's abounding with all the necessities of life. Nor was he deceived in his prediction; for Alexandria soon became the staple, not only for merchandise, but also for all the arts and sciences of the Greeks.

All authors agree, that this city was very commodiously situated. Its form resembled that of a soldier's coat. The streets were wisely contrived, so as to admit the cooling breezes to refresh the air. One large beautiful street passed from gate to gate, being 100 feet broad, and five miles long. It had a broad and high wall round it, so as to have the sea close on one side, and a great lake on the other, with a narrow pass at each end.

The architect employed by Alexander in this undertaking was the celebrated Diocorates, who had acquired so much reputation by rebuilding the temple of Diana at Ephesus. The city was first rendered populous by Ptolemy Soter, one of Alexander's captains, who, after the death of the Macedonian monarch, being appointed governor of Egypt, soon assumed the title of king, and took up his residence at Alexandria, about 304 years before Christ.

In the 30th year of Ptolemy Soter's reign, he took his son Ptolemy Philadelphus partner with him in the empire; and by this prince the city of Alexandria was much embellished. In the first year of his reign the famous watch-tower of Pharos was finished. It had begun several years before by Ptolemy Soter; and, when finished, was looked upon as one of the wonders of the world. The same year, the island of Pharos itself, originally seven furlongs distant from the continent, was joined to it by a causeway. This was the work of Dexiphanes, who completed it at the same time that his son put the last hand to the tower. The tower was a large square structure of white marble; on the top of which, fires were kept constantly burning, for the direction of sailors. The building cost 800 talents; which, if Attic, amounted to L. 165,000; if Alexandrian, to twice that sum.

The architect employed in this famous structure fell upon the following contrivance to usurp the whole glory to himself.—Being ordered to engrave upon it the following inscription, “King Ptolemy to the Gods the Saviours, for the benefit of Sailors;” instead of the king's name he substituted his own, and then filling up the hollow of the marble with mortar, wrote upon it the abovementioned inscription. In process of time, the mortar being wore off, the follow-

ing inscription appeared: “SOSTRATUS the Cnidian, Alexandria, the son of DEXIPHANES, to the Gods the Saviours, for the benefit of Sailors.”

This year also was remarkable for the bringing of the image of Serapis from Pontus to Alexandria. It was set up in one of the suburbs of the city called *Rhacotis*, where a temple was afterwards erected to his honour, suitable to the greatness of that stately metropolis, and called, from the god worshipped there, *Serapeum*. This structure, according to Ammianus Marcellinus, surpassed in beauty and magnificence all others in the world, except the capitol at Rome.—Within the verge of this temple was the famous Alexandrian library. It was founded by Ptolemy Soter, for the use of an academy he instituted in this city; and, by continual additions by his successors, became at last the finest library in the world, containing no fewer than 700,000 volumes. The method followed in collecting books for this library, was, to seize all those which were brought into Egypt by Greeks or other foreigners. The books were transcribed in the museum, by persons appointed for that purpose; the copies were then delivered to the proprietors, and the originals laid up in the library. Ptolemy Euergetes, having borrowed from the Athenians the works of Sophocles, Euripides, and Æschylus, returned them only the copies, which he caused to be transcribed in as beautiful a manner as possible; presenting the Athenians at the same time with fifteen talents (upwards of L. 3000 Sterling) for the exchange.

As the museum was at first in that quarter of the city call *Bruchion*, near the royal palace, the library was placed there likewise; but when it came to contain 400,000 volumes, another library, within the Serapeum, was erected by way of supplement to it, and on that account called the *daughter* of the former. In this second library 300,000 volumes, in process of time, were deposited; and the two together contained the 700,000 volumes already mentioned. In the war carried on by Julius Cæsar against the inhabitants of this city, the library in the Bruchion, with the 400,000 volumes it contained, was reduced to ashes. The library in the Serapeum, however, still remained; and here Cleopatra deposited 200,000 volumes of the Pergamean library, which Marc Antony presented her with. These, and others added from time to time, rendered the new library at Alexandria more numerous and considerable than the former; and though it was often plundered during the revolutions and troubles of the Roman empire, yet it was again and again repaired, and filled with the same number of books.

This library continued to be of great fame and use in these parts, till the year 642, when the Saracens made themselves masters of Alexandria. At that time, John, furnished the *grammarian*, a famous Peripatetic philosopher, being in the city, and in high favour with Amri-Abnol-As, the Saracen general, begged of him the royal library. Amri replied, that it was not in his power to grant such a request; but that he would write to the khalif on that head; since, without knowing his pleasure, he dared not to dispose of a single book. He accordingly wrote to Omar, who was then khalif, acquainting him with the request of his friend: To which the ignorant tyrant replied, That if those books contained the same doctrine with the koran, they could

Alexandria. be of no use, since the koran contained all necessary truths; but if they contained any thing contrary to that book, they ought not to be suffered; and therefore, whatever their contents were, he ordered them to be destroyed. Pursuant to this order, they were distributed among the public baths; where, for the space of six months, they served to supply the fires of those places, of which there was an incredible number in Alexandria.

This city, as we have already observed, soon became extremely populous; and was embellished both by its own princes, and the Romans; but, like most other noted cities of antiquity, hath been the seat of terrible massacres. About 141 years before Christ, it was almost totally depopulated by Ptolemy Physcon. That barbarous monster, without the least provocation, gave free liberty to his guards to plunder his metropolis, and murder the inhabitants at their pleasure. The cruelties practised on this occasion cannot be expressed; and the few who escaped, were so terrified, that they fled into other countries. Upon this, Physcon, that he might not reign over empty houses, invited thither strangers from the neighbouring countries; by whom the city was repopulated, and soon recovered its former splendor. On this occasion many learned men having been obliged to fly, proved the means of reviving learning in Greece, Asia Minor, the islands of the Archipelago, and other places, where it was almost totally lost.

The new inhabitants were not treated with much more kindness by Physcon than the old ones had been; for, on their complaining of his tyrannical behaviour, he resolved on a general massacre of the young men. Accordingly, when they were one day assembled in the gymnasium, or place of their public exercises, he ordered it to be set on fire; so that they all perished, either in the flames, or by the swords of his mercenaries, whom the tyrant had placed at all the avenues.

Though Julius Cæsar was obliged to carry on a war for some time against this city, it seems not to have suffered much damage, except the burning of the library already mentioned. Before Cæsar left Alexandria, in acknowledgment of the assistance he had received from the Jews, he confirmed all their privileges there, and even engraved his decree on a pillar of brass. This, however, did not prevent the massacre of 50,000 of them in this city about the year of Christ 67.

The city of Alexandria seems to have fallen into decay soon after this, and to have forfeited many of its ancient privileges, though for what offence is not known; but when Adrian visited Egypt, about the year 141, it was almost totally ruined. He repaired both the public and private buildings, not only restoring the inhabitants to their ancient privileges, but heaping new favours upon them; for which they returned him their solemn thanks, and conferred upon him what honours they could while he was present; but as soon as he was gone, they published the most bitter and virulent lampoons against him.

The fickle and satirical humour of the Alexandrians was highly disliked by Adrian, though he inflicted no punishment upon them for it; but when they lampooned Caracalla, he did not let them escape so easily. That tyrant, in the year 215, when he visited their city, having become the subject of their foolish satires,

ordered a general massacre by his numerous troops, who were dispersed all over the city. The inhuman orders being given, all were murdered, without distinction of age or sex; so that in one night's time the whole city floated in blood, and every house was filled with carcases. The monster, who occasioned this, had retired during the night to the temple of Serapis, to implore the protection of that deity; and, not yet fatiated with slaughter, commanded the massacre to be continued all the next day; so that very few of the inhabitants remained. As if even this had not been sufficient, he stripped the city of all its ancient privileges; suppressed the academy; ordered all strangers, who lived there, to depart; and that the few who remained might not have the satisfaction of seeing one another, he cut off all communication of one street with another, by walls built for that purpose, and guarded by troops left there.

Notwithstanding this terrible disaster, Alexandria soon recovered its former splendor, as Caracalla was murdered a short time after. It was long esteemed the first city in the world, next to Rome; and we may judge of its magnificence, and the multitude of people contained in it, from the account of Diodorus Siculus, who relates, that in his time, (44 years before Christ), Alexandria had on its rolls 300,000 freemen. Nor does it seem to have been at all inferior at the time it was taken by the Saracens; for the general above mentioned seems to have been astonished at its wealth and beauty, as appears by the following passage in his letter to the khalif, mentioned by Eutychius: "I shall not pretend to give a particular description of the city I have taken, nor send you an account of all the curious and valuable things contained in it. At present it will be sufficient to observe, that I have found in it 4000 palaces; 4000 baths; 40,000 Jews that pay tribute; 400 royal *Girci*, or places set apart for public diversions; and 12,000 gardeners, who supply the city with all kinds of herbs in great plenty."

At this time, according to the Arabian historians, Alexandria consisted of three cities, *viz.* *Menna*, or the port, which included Pharos, and the neighbouring parts; *Alexandria*, properly so called, where the modern Scandaria now stands; and *Nekita*, probably the Necropolis of Josephus and Strabo.

After the city was taken, Amri, the Saracen general, thought proper to pursue the Greeks who had fled farther up the country; and therefore marched out of Alexandria, leaving but a very slender garrison in the place. The Greeks, who had before fled on board their ships, being apprised of this, returned on a sudden, surprised the town, and put all the Arabs they found therein to the sword: but Amri, receiving advice of what had happened, suddenly returned, and drove them out of it with great slaughter; after which the Greeks were so intimidated, that he had nothing farther to fear from them.—A few years after, however, Amri being deprived of his government by the khalif Othman, the Egyptians were so much displeased with his dismissal, that they inclined to a revolt; and Constantine, the Greek emperor, having received intelligence of their disaffection, began to meditate the reduction of Alexandria. For this purpose, he sent one Manuel, an eunuch, and his general, with a powerful army, to retake that place; which, by the assistance of the Greeks in the city, who kept a secret correspondence

Alexandria. dence with the imperial forces while at sea, and joined them as soon as they had made a descent, he effected, without any considerable effusion of Christian blood. The khalif, now perceiving his mistake, immediately restored Amri to his former dignity. This step was very agreeable to the natives; who having had experience of the military skill and bravery of this renowned general, and apprehending that they should be called to an account by the Greeks for their former perfidious conduct, had petitioned Othman to send him again into Egypt.—Upon Amri's arrival, therefore, at Alexandria, the Copts, or natives, with the traitor Al-Mokawkas (who had formerly betrayed to Amri the fortrefs of Mefr) at their head, not only joined him, but supplied him with all kinds of provisions, exciting him to attack the Greeks without delay. This he did; and, after a most obstinate dispute which lasted several days, drove them into the town, where, for some time, they defended themselves with great bravery, and repelled the utmost efforts of the besiegers. This so exasperated Amri, that he swore, “If God enabled him to conquer the Greeks, he would throw down the walls of the city, and make it as easy of access as a *baroudy-house*, which lies open to every body.” Nor did he fail to execute this menace; for having taken the town by storm, he quite dismantled it, entirely demolishing the walls and fortifications. The lives of the citizens, however, were spared, at least as far as lay in the general's power; but many of them were put to the sword by the soldiers on their first entrance. In one quarter, particularly, Amri found them butchering the Alexandrians with unrelenting barbarity; to which, however, by his reasonable interposition, he put a stop, and on that spot erected a mosque, which he called the *mosque of mercy*.

From this time Alexandria never recovered its former splendor. It continued under the dominion of the khalifs till the year 924, when it was taken by the Magrebians, two years after its great church had been destroyed by fire. This church was called by the Arabs *Al Kaisaria*, or *Cesarea*; and had formerly been a pagan temple, erected in honour of Saturn, by the famous queen Cleopatra.

The city was soon after abandoned by the Magrebians; but in 928 they again made themselves masters of it: their fleet being afterwards defeated by that belonging to the khalif, *Abul Kafem* the Magrebian general retired from Alexandria, leaving there only a garriſon of 300 men; of which *Thmael*, the khalif's admiral, being apprised, he in a few days appeared before the town, and carried off the remainder of the inhabitants to an island in the Nile called *Abukair*. This was done, to prevent Abul-Kâfem from meeting with any entertainment at Alexandria, in case he should think proper to return. According to Eutychius, above 200,000 of the miserable inhabitants perished this year.

What contributed to raise Alexandria to such a prodigious height of splendor as it enjoyed for a long time, was, its being the centre of commerce between the Eastern and Western parts of the world. It was with the view of becoming master of this lucrative trade, that Alexander built this city, after having extirpated the Tyrians, who formerly engrossed all the East-India traffic. Of the immense riches which that trade afforded, we may form an idea, from considering that the

Romans accounted it a point of policy to oppress the Egyptians, especially the Alexandrians; and after the defeat of Zenobia, there was a single merchant of Alexandria who undertook to raise and pay an army out of the profits of his trade. The Greek emperors draw prodigious tributes from Egypt, and yet the khalifs found their subjects in so good circumstances as to screw up their revenues to three hundred millions of crowns.

Though the revolutions which happened in the government of Egypt, after it fell into the hands of the Mahometans, frequently affected this city to a very great degree; yet still the excellence of its port, and the innumerable conveniences resulting from the East-India trade, to whomsoever were masters of Egypt, preserved Alexandria from total destruction, even when in the hands of the most barbarous nations. Thus, in the 13th century, when the barbarism introduced by the Goths, &c. began to wear off from the European nations, and they acquired a taste for the elegancies of life, the old mart of Alexandria began to revive; and the port, though far from recovering its former magnificence, grew once more famous by becoming the centre of commerce: but having fallen under the dominion of the Turks, and the passage round the Cape of Good Hope being discovered by the Portuguese in 1499, a fatal blow was given to the Alexandria commerce, and the city has since fallen into decay.

At present, the city of Alexandria is reckoned to have about 14,000 or 15,000 inhabitants; a strange collocation of different nations, as well as from various parts of the Turkish empire. They are in general given to thieving and cheating; and (like their predecessors,) seditious above all others, were they not kept in awe by the severity of their government. The British and French carry on a considerable commerce with them, and have each a consul residing here. Some Venetian ships also sail thither yearly, but with French colours, and under the protection of France. The subjects of those kingdoms which keep no consuls here, are subjected to a tax by the Grand Signior: but the Jews have found out a method of indemnifying themselves for this disadvantage; namely, by selling their commodities cheaper than other foreigners can afford. They are also favoured by the farmers of the revenue; who know, that, if they do not pay some private regard to them, the Jews have it in their power to cause fewer merchandizes come into their port during the two years that their farm lasts.

The city is governed like others in the same kingdom *. It hath a small garriſon of soldiers, part of which are Janifaries and Assassins; who are very haughty and insolent, not only to strangers, but to the mercantile and industrious part of the people, though ever so considerable and useful. The government is so remiss in favour of these wretches, that Mr Norden informs us, one of them did not hesitate to kill a farmer of the customs, for refusing to take less of him than the duty imposed, and went off unpunished; it being a common salvo among them, that what is done cannot be undone.

The present condition of Alexandria is very deplorable, being now so far ruined, that the rubbish in many places overtops the houses. The famous tower of Pharos has long since been demolished; and a castle, called *Farillon*, built in its place. The causeway which joined

Alexandria*

* See Egypt.

Alexandria. the island to the continent is broken down, and its place supplied by a stone-bridge of several arches.

Some parts of the old walls of the city are yet standing. They are flanked with large towers, about 200 paces distant from each other, with small ones in the middle. Below are magnificent casemates, which may serve for galleries to walk in. In the lower part of the towers is a large square hall, whose roof is supported by thick columns of Thebaic stone. Above this are several rooms, over which there are platforms more than 20 paces square.

The next piece of antiquity is the pillar of Pompey, said to be built by Julius Cæsar in commemoration of his victory at Pharsalia. It stands upon an eminence, about 200 paces from the city, and is placed upon a square pedestal about seven or eight feet high; and the pedestal stands upon a square base, one of whose sides is 20 feet. Sandys says, it is 36 palms round, and 86 in height, each palm consisting of nine inches. The shaft is a single stone, by some called Theban marble, by others granite. On the top is a very fine capital. It is hard to say what machines they had in former times to raise such a vast stone as this; for Thevenot, in his last visit, by measuring the shadow, found it to be 75 royal feet of Paris, which is equal to 80 English. A few paces from hence stood Cæsar's palace: but the remains are only a few porphyry pillars, and the front, which is almost entire, and looks very beautiful. The palace of Cleopatra was built upon the walls facing the port, having a gallery on the outside, supported by several fine columns. Not far from Cleopatra's palace are two obelisks: one of these is thrown down, and almost buried in the sand; and though the other stands upright, the pedestal is hid by the sand that surrounds it. They are of granite; and each of the four sides are covered with hieroglyphics. About 70 paces from Pompey's pillar, is the khalis, or the canal of the Nile, which was dug by the ancient Egyptians, to convey the water of the Nile to Alexandria, and fill the cisterns under the city. On the side of the khalis, are gardens full of orange and lemon trees, and the fields are full of caper and palm trees. On the top of a hill is a tower, on which a centinel is always placed, to give notice, by means of a flag, of the ships that are coming into the port. From this hill may be seen the sea, the whole extent of the city, and the parts round it.

On the fourth-west side of the city, at a mile's distance, there are catacombs cut out of a rock, to enter which persons must creep upon all four; but the roof is ten feet high: on each side are sepulchres, cut out of the rock, of which there are four rows one above another. The bones in these places were very hard and looked very fresh. Over-against this there is another, that runs a long way, but will not admit a man to stand upright. These were, doubtless, burying-places belonging to the city. The Romans called such places catacombs. Alexandria is about 50 leagues north of Cairo. E. Long. 31. 15. N. Lat. 31. 12.

ALEXANDRIA, a strong and considerable city of Italy, belonging to the duchy of Milan, with a good castle, built in 1178 in honour of Pope Alexander III. This pope made it a bishopric, with several privileges and exemptions. Prince Eugene of Savoy took this city in 1706, after three days siege. The French took it in

1745; but the king of Sardinia, to whom it belongs by the treaty of Utrecht, retook it in 1746. The fortifications of the town are trifling, but the citadel is considerable. It is 15 miles south-east of Casal, 35 north-by-west of Genoa, and 40 south-by-west of Milan. E. Long. 8. 40. N. Lat. 44. 53. The country about this town is called the *Alexandria*.

ALEXANDRIA, (an. geog.) a city of Arachosia, called also *Alexandropolis*, on the river Arachotus, (Stephanus, Isidorus Characenus).—Another *Alexandria* in Gedrosia, built by Leonatus, by order of Alexander, (Pliny).—A third *Alexandria* in Aria, situated at the lake Arias, (Ptolemy); but, according to Pliny, built by Alexander on the river Arius.—A fourth in the Bactriana, (Pliny).—A fifth *Alexandria*, an inland town of Carmania, (Pliny, Ptolemy, Ammian.)—A sixth *Alexandria*, or *Alexandropolis*, in the Sogdiana, (Isidorus Characenus).—A seventh in India, at the confluence of the Acesines and Indus, (Arrian.)—An eighth called also *Alexandretta* near the Sinus Issicus, on the confines of Syria and Cilicia, now *Scanderoun**, the port-town to Aleppo.—A ninth *Alexandria* of Margiana, which being demolished by the barbarians, was rebuilt by Antiochus the son of Seleucus, and called *Antiochia* of Syria, (Pliny); watered by the river Margus, which is divided into several channels, for the purposes of watering the country, which was called *Zotale*. The city was seventy stadia in circuit, according to Pliny; who adds, that, after the defeat of Crassus, the captives were conveyed to this place by Orodes, the king of the Parthians.—A tenth, of the Oxiana, built on the Oxus by Alexander, on the confines of Bactria, (Pliny).—An eleventh, built by Alexander at the foot of mount Paropamisus, which was called *Caucasus*, (Pliny, Arrian.)—A twelfth *Alexandria* in Troas, called also *Troas* and *Antigonis*, (Pliny).—A thirteenth, on the Iaxartes, the boundary of Alexander's victories towards Scythia, and the last that he built on that side.

ALEXANDRIAN, in a particular sense, is applied to all those who professed or taught the sciences in the school of Alexandria. In this sense, Clemens is denominated *Alexandrinus*, though born at Athens. The same may be said of Apion, who was born at Oasis; and Arostarchus, by birth a Samothracian. The chief Alexandrian philosophers were, Ammonius, Plotinus, Origen, Porphyry, Jamblicus, Sopater, Maximus, and Dexippus.

ALEXANDRIAN is more particularly understood of a college of priests, consecrated to the service of Alexander Severus after his deification. Lampridius relates, that, notwithstanding Severus was killed by Maximin, the senate prosecuted his apotheosis; and, for regularity of worship, founded an order of priests, or *sodales*, under the denomination of *Alexandrini*.

ALEXANDRIAN, or *Alexandrin*, in poetry, a kind of verse consisting of twelve, or of twelve and thirteen syllables alternately; so called from a poem on the life of Alexander, written in this kind of verse by some French poet. Alexandrines are peculiar to modern poetry, and seem well adapted to epic poems. They are sometimes used by most nations of Europe; but chiefly by the French, whose tragedies are generally composed of Alexandrines.

ALEXICACUS, something that preserves the body

Alexandria,
Alexandrian.

* See *Alexandretta*.

Alexicacus
|
Alfred.

Alfred.

dy from harm or mischief. The word amounts to much the same as *alexiterial*.

ALEXICACUS, in antiquity, was an attribute of Neptune, whom the tunny-fishers used to invoke under this appellation, that their nets might be preserved from the *xiçac*, or sword-fish, which used to tear them; and that he might prevent the afflictance, which it was pretended the dolphins used to give the tunnies on this occasion.

ALEXIPHARMICS, in medicine, are properly remedies for expelling or preventing the ill effects of poison: but some of the moderns having imagined that the animal spirits, in acute distempers, were affected by a malignant poison, the term has been understood to mean medicines adapted to expel this poison by the cutaneous pores, in the form of sweat. In this sense, alexipharmics are the same as sudorifics.

ALEXIFERIAL, among physicians, a term of much the same import with *alexipharmic*; though sometimes used in a synonymous sense with amulet.

ALFYN (Charles), an English poet in the reign of Charles I. In 1631, he published two poems on the famous victories of Creci and Poitiers. He succeeded his father as clerk of the ordnance, and was commissary-general of the artillery to the king at the battle of Edgehill. The next piece he wrote was a poem in honour of Henry VII. and the victory that gained him the crown of England. In 1639, the year before he died, he translated the history of Eurilius and Lucretia, from the Latin epistles of *Æneas Sylvius*.

ALFAQUES, among the Moors, the name generally used for their clergy, or those who teach the Mahometan religion; in opposition to the Morabites, who answer to monks among Christians.

ALFATERNA, (anc. geog.) the last town of Campania, beyond Vesuvius, (Diodorus); the same with *Nuceria*, which see. The inhabitants *Alfaterni*, (Pliny.)

ALFET, in our old customs, denotes a caldron full of boiling water, wherein an accused person, by way of trial or purgation, plunged his arm up to the elbow.

ALFORD, a town in Lincolnshire, with a market on Tuesdays for provisions and corn; and two fairs, on Whit-Tuesday, and November 8. for cattle and sheep. It is seated on a small brook that runs through the town, and is a compact place. It is six miles from the sea, and 20 N. of Boston. E. Lon. o. 15. N. Lat. 53. 30.

ALFRED, or *ÆLFRED*, the Great, king of England, was the fifth and youngest son of *Æthelwolf* king of the West Saxons, and was born at Wantage in Berkshire in 849. He distinguished himself, during the reign of his brother *Ethelred*, in several engagements against the Danes; and upon his death succeeded to the crown, in the year 871, and the 22^d of his age. At his ascending the throne he found himself involved in a dangerous war with the Danes, and placed in such circumstances of distress as called for the greatest valour, resolution, and all the other vir-

tues with which he was adorned. The Danes had already penetrated into the heart of his kingdom; and before he had been a month upon the throne, he was obliged to take the field against those formidable enemies. After many battles gained on both sides, he was at length reduced to the greatest distress, and was entirely abandoned by his subjects. In this situation, Alfred, conceiving himself no longer a king, laid aside all marks of royalty, and took shelter in the house of one who kept his cattle. He retired afterwards to the Isle of *Æthelney* in Somersetshire, where he built a fort for the security of himself, his family, and the few faithful servants who repaired thither to him. When he had been about a year in this retreat, having been informed that some of his subjects had routed a great army of the Danes, killed their chiefs, and taken their magical standard (A), he issued his letters, giving notice where he was, and inviting his nobility to come and consult with him. Before they came to a final determination, Alfred, putting on the habit of a hermit, went into the enemy's camp, where, without suspicion, he was every where admitted, and had the honour to play before their princes. Having thereby acquired an exact knowledge of their situation, he returned in great secrecy to his nobility, whom he ordered to their respective homes, there to draw together each man as great a force as he could; and upon a day appointed there was to be a general rendezvous at the great wood, called *Selwood*, in Wiltshire. This affair was transacted so secretly and expeditiously, that, in a little time, the king, at the head of an army, approached the Danes, before they had the least intelligence of his design. Alfred, taking advantage of the surprise and terror they were in, fell upon them, and totally defeated them at *Æthelne*, now Eddington. Those who escaped fled to a neighbouring castle, where they were soon besieged, and obliged to surrender at discretion. Alfred granted them better terms than they could expect: he agreed to give up the whole kingdom of the East-Angles to such as would embrace the Christian religion, on condition they should oblige the rest of their countrymen to quit the island, and, as much as it was in their power, prevent the landing of any more foreigners. For the performance thereof he took hostages; and when, in pursuance of the treaty, Guthrum, the Danish captain, came, with thirty of his chief officers, to be baptized, Alfred answered for him at the font, and gave him the name of *Æthelstan*; and certain laws were drawn up betwixt the king and Guthrum for the regulation and government of the Danes settled in Kent. In 884, a fresh number of Danes landed in Kent, and laid siege to Rochester; but the king coming to the relief of that city, they were obliged to abandon their design. Alfred had now great success; which was chiefly owing to his fleet, an advantage of his own creating. Having secured the sea-coasts, he fortified the rest of the kingdom with castles and walled towns; and he besieged and recovered from

the

(A) " This (says Sir John Spelman) was a banner with the image of a raven magically wrought by the three sisters of Hingwar and Hubba, on purpose for their expedition, in revenge of their father Lodebroch's murder, made, they say, almost in an infant, being by them at once begun and finished in a noontide, and believed by the Danes to have carried great fatality with it, for which it was highly esteemed by them. It is pretended, that being carried in battle, towards good success it would always seem to clap its wings, and make as if it would fly; but towards the approach of mishap, it would hang down and not move." *Life of Alfred*, p. 61.

Alfred.

the Danes the city of London, which he resolved to repair, and keep as a frontier (b).

After some years respite, Alfred was again called into the field: for a body of Danes, being worsted in the west of France, came with a fleet of 250 sail on the coast of Kent; and having landed, fixed themselves at Appletree: shortly after, another fleet of 80 vessels coming up the Thames, the men landed, and built a fort at Middleton. Before Alfred marched against the enemy, he obliged the Danes, settled in Northumberland and Essex, to give him hostages for their good behaviour. He then moved towards the invaders, and pitched his camp between their armies, to prevent their junction. A great body, however, moved off to Essex; and crossing the river, came to Farnham in Surrey, where they were defeated by the king's forces. Mean while the Danes settled in Northumberland, in breach of treaty, and notwithstanding the hostages given, equipped two fleets; and, after plundering the northern and southern coasts, sailed to Exeter, and besieged it. The king, as soon as he received intelligence, marched against them; but before he reached Exeter, they had got possession of it. He kept them, however, blocked up on all sides; and reduced them at last to such extremities, that they were obliged to eat their horses, and were even ready to devour each other. Being at length rendered desperate, they made a general sally on the besiegers; but were defeated, though with great loss on the king's side. The remainder of this body of Danes fled into Essex, to the fort they had built there, and to their ships. Before Alfred had time to recruit himself, another Danish leader, whose name was Laf, came with a great army out of Northumberland, and destroyed all before him, marching on to the city of Werheal in the west, which is supposed to be Chester, where they remained the rest of that year. The year following they invaded North-Wales; and after having plundered and destroyed every thing, they divided, one body returning to Northumberland, another into the territories of the East-Angles; from whence they proceeded to Essex, and took possession of a small island called *Merefig*. Here they did not long remain: for having parted, some sailed up the river Thames, and others up the Lea-road; where drawing up their ships, they built a fort not far from London, which proved a great check upon the citizens, who went in a body and attacked it, but were repulsed with great loss: at harvest-time the king himself was obliged to encamp with a body of troops in the neighbourhood of the city, in order to cover the reapers from the excursions of the Danes. As he was one day riding by the side of the river Lea, after some observation, he began to think that the Danish ships might be laid quite dry: this he attempted, and succeeded; so that the Danes de-

serted their fort and ships, and marched away to the banks of the Severn, where they built a fort, and wintered at a place called *Quatbrig* (c). Such of the Danish ships as could be got off, the Londoners carried into their own road; the rest they burnt and destroyed.

Alfred enjoyed a profound peace during the three last years of his reign, which he chiefly employed in establishing and regulating his government, for the security of himself and his successors, as well as the ease and benefit of his subjects in general. After a troublesome reign of 28 years, he died on the 28th of October A. D. 900; and was buried at Winchester, in Hyde-abbey, under a monument of porphyry.

All our historians agree in distinguishing him as one of the most valiant, wisest, and best of kings that ever reigned in England; and it is also generally allowed, that he not only digested several particular laws still in being, but that he laid the first foundation of our present happy constitution. There is great reason to believe that we are indebted to this prince for trials by juries; and the doomsday-book, which is preserved in the exchequer, is thought to be no more than another edition of Alfred's book of Winchester, which contained a survey of the kingdom. It is said also, that he was the first who divided the kingdom into shires: what is ascribed to him is not a bare division of the country, but the settling a new form of judicature; for after having divided his dominions into shires, he subdivided each shire into three parts, called *tythings*. There are some remains of this ancient division in the ridings of Yorkshire, the laths of Kent, and the three parts of Lincolnshire. Each *tything* was divided into hundreds or wapentakes; and these again into *tythings*, or dwellings of ten householders: each of these householders stood engaged to the king, as a pledge for the good behaviour of his family, and all the ten were mutually pledges for each other; so that if any one of the *tything* was suspected of an offence, if the head boroughs or chiefs of the *tything* would not be security for him, he was imprisoned; and if he made his escape, the *tything* and hundred were fined to the king. Each shire was under the government of an earl, under whom was the reeve, his deputy; since, from his office, called *shire-reeve*, or *sheriff*. And so effectual were these regulations, that it is said he caused bracelets of gold to be hung up in the highways, as a challenge to robbers; and they remained untouched.

In private life, Alfred was the most amiable man in his dominions; of so equal a temper, that he never suffered either sadness or unbecoming gaiety to enter his mind; but appeared always of a calm, yet cheerful disposition, familiar to his friends, just even to his enemies, kind and tender to all. He was a remarkable economist of his time, and Asserius has given us an account

(a) The Danes had possessed themselves of London in the time of his father; and had held it till now as a convenient place for them to land at, and fortify themselves in; neither was it taken from them but by a close siege. However, when it came into the king's hands, it was in a miserable condition, scarce habitable, and all its fortifications ruined. The king, moved by the importance of the place, and the desire of strengthening his frontier against the Danes, restored it to its ancient splendor. And observing, that, through the confusion of the times, many, both Saxons and Danes, lived in a loose disorderly manner, without owing any government, he offered them now a comfortable establishment, if they would submit and become his subjects. This proposition was better received than he expected; for multitudes growing weary of a vagabond kind of life, joyfully accepted such an offer. *Chron. Sax.* p. 88.

(c) The king's contrivance is thought to have produced the meadow between Hertford and Bow; for at Hertford was the Danish fort, and from thence they made frequent excursions on the inhabitants of London. Authors are not agreed as to the method the king pursued in laying dry the Danish ships: Dugdale supposes that he did it by straitening the channel; but Henry of Huntingdon alleges, that he cut several canals, which exhausted its waters.

Alfred.

Alfred. account of the method he took for dividing and keeping an account of it: he caused fix wax-candles to be made, each of 12 inches long, and of as many ounces weight; on the candles the inches were regularly marked, and having found that one of them burnt just four hours, he committed them to the care of the keepers of his chapel, who from time to time gave him notice how the hours went: but as in windy weather the candles were waisted by the imprefion of the air on the flame, to remedy this inconvenience, he invented lanterns, there being then no glafs in his dominions.

This prince, we are told, was 12 years of age before a mafter could be procured in the western kingdom to teach him the alphabet; fuch was the ftate of learning when Alfred began to reign. He had felt the mifery of ignorance; and determined even to rival his contemporary Charlemagne in the encouragement of literature. He is fuppofed to have appointed perfons to read lectures at Oxford, and is thence confidered as the founder of that univerfity. By other proper eftablifhments, and by a general encouragement to men of abilities, he did every thing in his power to difufe knowledge throughout his dominions. Nor was this end promoted more by his countenance and encouragement, than by his own example and his writings. For notwithstanding the lateness of his initiation, he had acquired extraordinary erudition; and, had he not been illuftrious as a king, he would have been famous as an author. His works are, 1. *Breviarum quoddam collectum ex Legibus Trojanorum*, lib. I. A Breviary collected out of the Laws of the Trojans, Greeks, Britons, Saxons, and Danes; in one book. Leland faw this book in the Saxon tongue, at Chrift-church in Hamphshire. 2. *Vif-Saxonum Lege*, lib. I. The laws of the Weft-Saxons, in one book. Pitts tells us, that it is in Bennet-College library, at Cambridge. 3. *Inftituta quedam*, lib. I. Certain Inftitutes, in one book. This is mentioned by Pitts, and feems to be the fecond capitulation with Guthrum. 4. *Contra Judices iniquos*, lib. I. An Inveftive againft Unjuft Judges, in one book. 5. *Acta Magistratum fuorum*, lib. I. Acts of his Magiftrates, in one book. This is fuppofed to be the book of judgments mentioned by Horne; and was, in all probability, a kind of reports, intended for the ufe of fucceeding ages. 6. *Regum Fortuna varia*, lib. I. The various Fortunes of Kings, in one book. 7. *Difta Sapientum*, lib. I. The Sayings of Wife Men, in one book. 8. *Parabola et Sales*, lib. I. Parables and

pleafant Sayings, in one book. 9. *Collecciones Chronicorum*. Collections of Chronicles. 10. *Epiftola ad Wulfifigium Epifcopum*, lib. I. Epiftles to Bifhop Wulfifig, in one book. 11. *Manuale Meditationum*. A Manual of Meditations.—Besides thefe original works, he tranflated many authors from the Latin, &c. into the Saxon language, viz. 1. Bede's Hiftory of England, 2. Paulinus Orolinus's Hiftory of the Pagans. 3. St Gregory's Paftoral, &c. The firft of thefe, with his prefaces to the others, together with his laws, were printed at Cambridge, 1644. His laws are likewise inferted in Spelman's Councils. 4. *Boetius de Confolatione*, lib. V. Boetius's Confolations of Philofophy, in five books. Dr Plot tells us, king Alfred tranflated it at Woodftock, as he found in a MS. in the Cotton Library. 5. *Æfopi Fabula*. Æfop's Fables: which he is faid to have tranflated from the Greek both into Latin and Saxon. 6. *Pfalterium Davidicum*, lib. I. David's Pfalter, in one book. This was the laft work the king attempted, death furprifing him before he had finifhed it; it was however completed by another hand, and publifhed at London in 1640, in quarto, by Sir John Spelman. Several others are mentioned by Malmfbury; and the old Hiftory of Ely afferts, that he tranflated the Old and New Testaments.

The life of this great king was firft written by Afferius Menevenfis; and firft publifhed by Archbifhop Parker, in the old Saxon character, at the end of his edition of Haffingham's hiftory, printed in 1674, fol.

ALGA, in botany, the trivial name of the lichen, fucus, and feveral other plants of the cryptogamia clafs.

ALGAGIOLA, a fmall fea-port town in the ifland of Corfica, fortified with walls and batfions. It was almoft destroyed by the malcontents in 1731, but has fince been repaired. E. Long. 9. 45. N. Lat. 42. 20.

ALGAROT, in chemiftry, an Arabic term for an emetic powder, prepared from regulus of antimony, difolved in acids, and feparated by repeated lotions in warm water.

ALGARVA, a province in the kingdom of Portugal, 67 miles in length, and 20 in breadth; bounded on the W. and S. by the fea, on the E. by the river Guadiana, and on the N. by Alentejo. It is very fertile in figs, almonds, dates, olives, and excellent wines; befides, the fifhery brings in large fums. The capital town is Pharo. It contains four cities, 12 towns, 67 parifhes, and 61,000 inhabitants.

A L G E B R A,

Definition, and etymology.

A GENERAL method of computation, wherein figns and fymbols, commonly the letters of the alphabet, are made ufe of to reprent numbers, or any other quantities.

This fcience, properly fpeaking, is no other than a kind of fhort-hand, or ready way of writing down a chain of mathematical reafoning on any fubject whatever; fo that it is applicable to arithmetic, geometry, aftronomy, menfuration of all kinds of folids, &c. and the great advantages derived from it appear manifefly to arife from the concifenefs and perfpicuity with which every propofition on mathematical fubjects can be wrote down in algebraic characters, greatly fuperior to the

tedious circumlocutions which would be neceffary were the reafoning to be written in words at length.

With regard to the etymology of the word *algebra*, it is much contefted by the critics. Menage derives it from the Arabic *aljabarat*, which fignifies the refolution of any thing broken; fuppofing that the principal part of algebra is the confideration of broken numbers. Others rather borrow it from the Spanifh, *algebrista*, a perfon who replaces diflocated bones; adding, that algebra has nothing to do with fraction. Some, with M. d'Herbelot, are of opinion, that algebra takes its name from Gebar, a celebrated philofopher, chemift, and mathematician, whom the Arabs call

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Algarva.

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Elementary
Rules.

ness, solidity, &c. but when once a letter is appropriated to one particular kind of quantity, it cannot stand for any other, in that demonstration, or piece of reasoning. Thus, though the letter a may represent any quantity of water, earth, &c. yet if it is once appropriated to any of these, water, for instance, it cannot likewise represent earth; as this would produce confusion. Each species of quantity, therefore, must be represented by a different letter.—As all quantities, concerning which we speak, must be either known or unknown; and both these are frequently represented by letters in algebraic operations; it will be proper to use the first letters of the alphabet, a, b, c , &c. to represent one kind of quantities; and the last letters, x, y, z , to represent the others; that there may be as little danger of mistake as possible.

Positive and
negative
quantities.

Besides this obvious division of quantity, into known and unknown; algebraists consider quantities as positive or negative, simple or compound, roots or powers, rational or irrational.—Positive quantities are such as, by their preference, always denote an increase, or addition of something which was not there before; and therefore they have always *plus*, the sign of addition, prefixed to them: but as quantity is generally spoken of in a positive sense, the sign is omitted before a single letter, or before the first term of any series of quantities expressed by letters. Thus, if a simply is wrote down, $+a$ is supposed to be meant; in like manner, in the series $a+b+c$, &c. the first term or letter is always supposed to be positive. Negative quantities are intended to express the difference between one positive quantity and another. By themselves they cannot have any existence, as they would be less than nothing, which is absurd. These quantities have always the sign of subtraction, *minus*, prefixed to them; whether they stand first or last. If a single letter is marked with the sign of subtraction, it is always supposed to have a respect to some other quantity which is not expressed. Thus, a by itself represents a positive quantity of any kind; $-a$ does not by itself represent any thing, but only the difference between the former a , or $+a$, and some other quantity which at that time is not expressed; but if another quantity, expressed by b , is wrote down before it, as $b-a$, this denotes the difference between b and a . The same thing would be denoted though the order of the terms were inverted; $b-a$ is the same with $-a+b$; but in writing the terms of an algebraic series, positive quantities ought to precede negative ones; and those which have like signs, whether $+$ or $-$, ought always to be placed together.

Addition &
subtraction.

By attending to this distinction between positive and negative quantities, addition and subtraction of algebraic characters will be very easy. Every letter in algebra is supposed to represent something real, and the letter is only put for it; because it is easier expressed than the name of the thing itself. Thus, suppose a to represent a gallon of water; if I want to add another gallon, or another a , to the first one, the sum is two gallons; or, in algebraic short-hand, $2a$. In like manner, if we want to add another a , the sum will be $3a$. But if we want to add one species of quantity to another, as a pound of earth to a gallon of water, we must take one letter for the one species, and another for the other. Thus, let a represent the earth, and b the water; when these two are added together, the sum is nei-

ther two pounds of earth, nor two gallons of water: the sum of their literal representatives, therefore, can neither be $2a$, nor $2b$; but $a+b$. Here it will be observed, that, where quantities of the same kind, expressed by the same letter, are added together, some arithmetical figures must be prefixed to the algebraic ones; and these numbers, called *coefficients*, or *unities*, are to be managed exactly in the same way, as in common arithmetic. Thus $a+a$ is $2a$, and $2a+3a$ is $5a$: a added to b can only be represented by $a+b$; in like manner, $7a$ added to $5b$ will neither make $12a$, nor $12b$; therefore, the sum of these two can only be represented by $7a+5b$. When quantities occur which have contrary signs, there is a necessity for subtracting the one from the other, in order to come at the true sum. Thus if a man has £10 of stock in hand, and £5 of debt; in order to come at his real worth, we must subtract the debt from the goods. If the £10 of goods is represented by $10a$, and the £5 of debt by $5a$, it is as plain, that the sum must be only $10a-5a$, or $5a$. If dissimilar letters occur, having contrary signs, they must be wrote down with the signs prefixed that are proper to each. Thus, the sum of $2a$, $3a$, and $-7b$, is $2a+3a-7b$, or $5a-7b$; of $2a$, $5a$, $6b$, and $-7b$, is $2a+5a+6b-7b$, or $7a-b$, &c.

Subtraction of algebraic characters consists in changing the sign of the quantity to be subtracted, and then following the above rules for addition. Thus, if I am to take $2a$ from $5a$, I change the sign of the $2a$, and write it thus, $5a-2a$; adding these, I find the sum to be $3a$, as already mentioned. If the letters are dissimilar, they must be wrote down with the sign of subtraction—between them: as, if I subtract b from a , the remainder will be $a-b$; but if I take $-b$ from a , I must change its sign to $+$, and then the remainder is $a+b$. The reason is evident, from the former example. If a man has £10 in goods, and owes £5; if I want to take away his debt, I must add to his stock, or prevent the debt from affecting it, which is the same thing. If I represent the goods by a , and the debt by b , the true state of his affairs will be represented by $a-b$. If I want to take away $-b$ from this, I must change its sign to $+$; and then the $+b$ and $-b$ destroy one another: so that the remainder, after taking away the debt, is a , or £10; which is agreeable to truth.

Quantities are considered by algebraists as simple or compound. The simple quantities are such as are represented by single letters, as a, b, c , &c. Compound quantities arise only from the addition or subtraction of dissimilar simple ones: thus, $a+b$, $b+c$, and all others connected by the signs $+$ or $-$, are called *compound quantities*. By multiplication of simple quantities, compound ones are not produced: for letters are multiplied into one another by writing them down in connection, without any sign, or with \times , the sign of multiplication, between them; as axb , or abx , denotes the product of a multiplied into b . In algebra, the signs prefixed to the quantities, are objects of multiplication, as well as the letters or coefficients of the letters themselves: thus, $+a$ multiplied into $+$, always gives $+$ for the product; and $-$ multiplied into $-$ gives the same; but $+$ into $+$, or $+$ into $-$, give $-$ for the product.

That $+$ multiplied into $+$ should give $+$, or that $+$ into $-$ should give $-$ for the product, will readily be comprehended: but why $-$ multiplied into $-$ should give $+$, is not so easily understood. Different methods have

Elementary Rules.

Why $-x$ gives $+$ for the product.

Elementary Rules.

have been used to illustrate the reason of this; but all of them seem involved in some degree of obscurity, from which we hope the following will be altogether free.

We have already observed, that no quantity is in itself negative, but only as it stands in relation to another. Positive and negative quantities, therefore, arise only from addition and subtraction, but not from multiplication. Four inches in measure are a positive quantity in themselves, and are positive or negative in algebraic writing according as they are added to or taken away from any thing. Negative quantities, therefore, are capable of being added or subtracted, but not of being multiplied, as negatives. Suppose one merchant owes £100, another £50, and a third buys the stock, and becomes liable for the debts of both. His capital will then be negatively affected by both debts; and if we call it a , the debt of the first merchant b , and of the second c , his real worth will be expressed by $a - b - c$, and may be found by subtracting the sum of the debts from his stock; but it is impossible to multiply the two debts together in any manner of way, so as to affect him by the product of the numbers; the reason is, because we change the relation by multiplying them. In like manner, if we cut four inches from a ruler, these with respect to the whole ruler will be -4 ; but if we multiply the -4 , or the part cut off, by itself, we produce $+16$ square inches, which have not, nor can have, any relation to the ruler itself, but will become positive or negative with regard to another quantity, just as we please to add or subtract them. The case is different when a negative quantity is multiplied by a positive one; because then the relation is not changed. Thus, in the former example, if we cut off four inches from a ruler, the quantity cut off is -4 ; if we multiply this -4 by $+2$, or, which is the same thing, want to add other four inches to those already cut off, we must take them from the ruler, and thus the product will be -8 .

In multiplication of algebraic characters, there is not the least difficulty. The signs are multiplied as we have already mentioned; the coefficients, as in common arithmetic; and the letters, by writing them down without any sign between them: thus, $2a$ multiplied into $3b$, produces $6ab$, or $6ba$; for the order of the letters is of no consequence. If the multiplier and multiplicand are both compound quantities, each term of the first must be multiplied into all those of the second, and all the products added together: thus, if $a - b$ is to be multiplied by $a - b$, I first multiply by a , which produces $aa - ab$; I then multiply by $-b$, and the produce is $-ab + bb$; and, adding these two products together, we have $aa - 2ab + bb$ for the total produce.

Division.

Division being the converse of multiplication, what has been said concerning the latter, will also serve to make the former easily understood. When the same letters are contained in the divisor and dividend, these division may properly take place: thus, if I am required to divide abc by a , the quotient will be bc ; because bc multiplied into a , produces abc the dividend. If I am to divide it by b , the quotient will be ac ; because $ac \times b$ is ab , or abc . With regard to the signs, they are to be managed so, that the sign of the divisor multiplied into that of the quotient may produce the sign of the dividend; and it must always be carefully observed to change the sign of that quantity which is subtracted from the dividend, whether the subtraction

can properly take place or not. The coefficients, or pure numbers, are to be divided exactly as in common arithmetic. Suppose now it is required to divide $aa - 2ab + bb$ by $a - b$, I begin with considering what sign multiplied into that of the divisor will give that of the dividend for a product: as they are both positive quantities, this must be $+$. I next consider what letter multiplied into the first term of the divisor will give the first term of the dividend for a product. This I find to be a ; for $a \times a$ gives aa for the product. I then multiply this first term of the quotient into both terms of the divisor; and behaved to do so, though there were three, four, or more terms in it. The product is $aa - ab$. Subtracting this product from the dividend, there remains $-ab + bb$ for a new dividend. I must now again consider what sign multiplied into that of the first term of the divisor will give the sign of the first term of the dividend; which I here find to be $-$. By again considering what letter multiplied into the first term of the divisor will give the first term of the dividend for a product, I find it to be b ; which multiplied into both terms of the divisor, produces $-ab + bb$; which, subtracted from the new dividend, leaves no remainder.

If the letters are totally different, or the first term of the divisor cannot be found in the dividend, these division cannot take place; the quantities must in this case be wrote down with $+$ the sign of division between them, or placed the one over the other like fractions, as $a + b$, $\frac{a}{b}$, $\frac{bd + cf}{e^2}$, &c. but as long as the first term of the divisor will divide the first term of the dividend, the operation may be continued; and sometimes the quotient will run out an infinite series of terms, as in the following example:

$$\begin{array}{r} 1+x) 1(1-x+xx-xxx, \&c. \\ \underline{1+x} \\ -x \\ \underline{-x-xx} \\ +xx \\ \underline{+xx+xxx} \\ -xxx \\ \underline{-xxx-xxxx} \\ +xxxx, \&c. \end{array}$$

If a quantity is multiplied into itself any number of times, the products are said to be the powers of that quantity, which is called the root, with respect to them. The powers are distinguished by the names of square; cube, or third power; biquadrate, or fourth power; sursolid, or fifth power; cube squared, or sixth power, &c. and are thus wrote: a^2 , or simply a , the radical quantity; a^2 , or a squared, or multiplied into itself; a^3 , a cubed, or the square of a multiplied by a ; a^4 , signifying the square of a multiplied by itself, &c. The multiplying a quantity by itself any number of times is called involving that quantity to a certain height, the sign of which is ϕ ; and if the root of an involved quantity is required, the operation by which it is found is called evolution, and is expressed by the sign ψ .

Involution of a simple quantity is performed merely by writing it down with a figure above; as a^2 , a^3 , a^4 , &c. expressing the height of the power to which it is involved.

involved. These figures are named the *indices*, or exponents of the powers. Involution of compound quantities is performed by continual multiplication; but any root, consisting of only two terms, such as $a+b$, or $a-b$, (the first of which is called a *binomial*, and the second a *residual* root) may be involved to any height, by the following rule.

The power must always consist of one term more than is expressed by its index: that is, if it is required to raise $a+b$ to the square, the power will consist of three terms; if to the cube, of 4 terms; to the biquadrate, of 5; to the surfold, of 6, &c. The first and last terms are both pure powers, without any coefficients, the one of the first and the other of the last term of the root, the indices of both which express the height of the power. Thus, if I am to involve $a+b$ to the sixth power, the first term must be a^6 , and the last b^6 . In the intermediate terms the index of a decreases, and that of b gradually increases, till it attains the same height that a had at first. The letters of the 6th power of $a+b$, therefore, without their coefficients, will stand thus:

$$a^6 + a^5b + a^4b^2 + a^3b^3 + a^2b^4 + ab^5 + b^6.$$

To find the coefficients, multiply the index of any term into its coefficient, and divide by the number of terms; the quotient is the coefficient of the term immediately following. In the first term, the coefficient, though not expressed, is supposed to be 1. This multiplied by 6 the index, and divided by the number of terms 1, quotes 6 for the coefficient of the second term, which therefore is $6a^5b$: multiplying then the index 5, by this coefficient 6, and dividing by 2, the number of terms, I have 15 for the coefficient of the third, and the term is $15a^4b^2$. Proceeding in this manner, I find the power required, to be

$$a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6.$$

The residual root, $a-b$, is involved by the very same rules; only the signs, instead of being constantly +, are + and - alternately; and thus the 6th power of $a-b$ will be

$$a^6 - 6a^5b + 15a^4b^2 - 20a^3b^3 + 15a^2b^4 - 6ab^5 + b^6.$$

If the root consists of three or more terms, no rule can be formed by which the quantity can be so easily involved to the required height, as continual multiplication; because there are such a number of terms, and the letters are so intermingled with one another, that it would be difficult to remember the numerous directions necessary in such a case: nor do such tedious multiplications often occur; but where they do, it is proper to range the product according to the number of times that a certain letter is repeated in every term, which is called the ranging it according to the *dimensions* of that letter. Thus, suppose I am to raise $a+b+c$ to the cube: by multiplying it twice, I find the product to be $a^2+3a^2b+3a^2c+6abc+3ab^2+3ac^2+3b^2c+3bc^2+c^3$

This long line is exceedingly confused, and difficult to be comprehended at one view; but by ranging it according to the dimensions of any of its letters, is much more plain and intelligible: according to the dimensions of the letter a , it stands thus:

$$\begin{array}{r} a^3+3b^2a^2+3c^2a^2 \\ +3ac^2a^2+3b^2a^2+3bc^2a^2 \\ +3c^2a^2+3b^2a^2+3bc^2a^2 \\ +3c^2a^2+3b^2a^2+3bc^2a^2 \end{array}$$

As Evolution, or the extraction of roots, is proper-

ly the solution of a certain kind of equations, it will be more properly treated of, after the nature of equations in general, and the methods of solving the more simple ones, are considered.

In algebra, as in common arithmetic, fractions arise from the division of quantities that are incommensurable to one another, or those of which the lesser will not divide the greater without a remainder; but as the rules for adding, subtracting, multiplying, &c. of algebraic fractions are exactly the same with those for performing the same operations on arithmetical ones, only making allowance for the difference between adding, subtracting, &c. letters, instead of figures, we refer to the article ARITHMETIC.

Hitherto we have only considered such quantities as must be supposed always to have a positive or real existence, and consequently can be expressed by a certain symbol; but, besides these, there are other imaginary quantities, the existence of which it is often necessary to suppose, though in fact they have not, nor cannot have, an existence. Thus, if I am required to find a number which, multiplied into itself, will produce 16; it is easily found, and such a number may be expressed by a : but if I am required to find one, which, multiplied by itself, will produce 15, it cannot be found by any art, and consequently cannot be expressed by a letter. Quantities of this kind are denominated, by algebraists, *surds*, or *irrational* ones; and have the sign $\sqrt{\quad}$ prefixed to them, which denotes their imaginary existence. This sign denotes the extraction of a root; and the different kinds of roots desired, are expressed by figures set over it. Thus, $\sqrt[4]{\quad}$, or simply $\sqrt{\quad}$, denotes that the square root is desired; $\sqrt[3]{\quad}$, the cube-root, &c. Sometimes this sign is prefixed to a number, or to an algebraic series which is capable of affording a true rational root; but it then only denotes that the root hath not been extracted, and consequently exists as yet only in idea. The prefixing this sign to any letter makes no other difference with regard to addition, subtraction, multiplication, or division, than causing the letter represent a different quantity than otherwise it would have done, and so must be added or subtracted by signs. Thus a added to a , makes $2a$; but a added to \sqrt{a} , is $a+\sqrt{a}$. Among themselves surds are as easily managed as any other quantities: for $\sqrt{a}+\sqrt{a}$ is $2\sqrt{a}$, and $\sqrt{a}-\sqrt{a}$ is 0; $\sqrt{a+3}\sqrt{a-2}$ is $2\sqrt{a}$; $\sqrt{a} \times 2b$ is $2b\sqrt{a}$; $8\sqrt{a+2}\sqrt{a}$ is 4 ; $10\sqrt{a}b+5\sqrt{b}$ is $2\sqrt{a}$, &c.—In the multiplying surds by themselves, or involving them, we need sometimes only throw away the radical sign: thus $\sqrt{a} \times \sqrt{a}$ is a ; and $\sqrt{a} \times \sqrt{a}$ is a/a ; $\sqrt{a} \times \sqrt{a}$ is a , &c. When the root of any compound quantity is sought, it multiplies, besides the radical sign, have a line drawn over it, to denote that it is only to be reckoned a simple quantity; thus $\sqrt{ab+cd}$, &c. In cases where irrational quantities of this kind occur, it will be proper to put some letter, as x , y , z , or any other not already used, for the surd, and let that symbol remain till the last step of the operation, when the true value may be substituted in its place.

Surds, like fractions, may be reduced to their least terms; or two unlike surd quantities may be reduced to two having the same denomination. To reduce a surd quantity to its lowest terms, a certain rational root must be found in it, multiplied by a surd; the root must be extracted according to the rules hereafter given.

Equations.

ven for evolution, and prefixed to the other quantity with the radical sign. Thus, though no number multiplied into itself will produce 8, yet such an imaginary quantity may be expreffed otherwife than by $\sqrt{8}$; for 8 contains the number 4, which is a perfect square, and produced by multiplying 2 into itself. $\sqrt{8}$ therefore is reduced to $\sqrt{4 \times 2}$: but one of these is a perfect square; and therefore $\sqrt{4 \times 2}$ is $2\sqrt{2}$, which is the surd in its lowest terms. In like manner, $\sqrt{28}$ is $\sqrt{4 \times 7}$ or, $2\sqrt{7}$; $\sqrt{18}$ is $\sqrt{9 \times 2}$, or $3\sqrt{2}$. The same rule holds in algebraic quantities. $\sqrt{4a^2b}$ is $\sqrt{4a^2} \times \sqrt{b}$, or $2a\sqrt{b}$; $\sqrt{4a^2b^2}$ is $\sqrt{4a^2} \times \sqrt{b^2}$; which being both complete squares, the surd is reduced to $2a\sqrt{b}$, or $2ab$.

This method of reducing surds is often very convenient for bringing them into less compass, so as to facilitate their addition or subtraction. Thus $\sqrt{18} + \sqrt{32}$, being reduced to their least terms, become $3\sqrt{2} + 4\sqrt{2}$, or $7\sqrt{2}$; and $\sqrt{8a^2} + \sqrt{50a^2} = \sqrt{72a^2}$, is reduced to $2a\sqrt{2} + 5a\sqrt{2} = 6a\sqrt{2}$, or $6a\sqrt{2}$; $\sqrt{12a^2x} + \sqrt{75a^2x}$, becomes $2a\sqrt{3x} + 5a\sqrt{3x}$, or $7a\sqrt{3x}$, &c.

Reduction of surds.

Surds are reduced to the same denomination, by involving them to a proper height; but in order to understand this the more readily, it is proper to take notice, that in any series of powers, as $a, a^2, a^3, a^4, a^5, a^6$, &c. the addition of the indices is equivalent to the involution of the power, and the subtraction of the indices is equivalent to the division of the powers by one another. Thus, by subtracting the index 4 from 7 in the powers a^4 and a^7 , there remains a^3 ; which is the quotient of a^7 divided by a^4 ; as is evident from dividing $aaaaaa$ by $aaaa$. In like manner, the division of the indices answers to the extraction of the root: thus, to divide the index of a^6 by 2, is the same thing as to extract its square root; to divide it by 3, is the same thing as to extract its cube root; the quotients being a^3 and a^2 , answering to the powers aaa and aa . This division cannot go farther in rational quantities, than that of 2 the index of the square by itself. The quotient is 1, which is the index of $\sqrt{a^2}$, being a^1 , or simply a . The square or cube root of a , then, must be expreffed by a division of its index 1, by 2 or 3,

and may be wrote $a^{\frac{1}{2}}$, $a^{\frac{1}{3}}$, as well as \sqrt{a} and $\sqrt[3]{a}$. When surds are to be reduced to the same denomination, it will be most proper to write them with these fractional indices; the fractions have then only to be reduced to a common denominator, according to the rules of arithmetic: and thus, $a^{\frac{1}{2}}$ and $a^{\frac{1}{3}}$ will become $a^{\frac{2}{6}}$ and $a^{\frac{1}{6}}$. This reduction is convenient when surds are to be multiplied or divided by one another. For example; suppose I was to multiply the two above-mentioned surds into one another, no more is necessary than to add the two indices together, after having reduced them to a common denominator, and the product is $a^{\frac{3}{6}}$; which intimates, that the product of \sqrt{a} into $\sqrt[3]{a}$ is equivalent to $\sqrt[6]{a^3}$; $\sqrt{2}$ and $\sqrt[3]{3}$ will become $2^{\frac{2}{6}}$ and $3^{\frac{1}{6}}$, or $\sqrt[6]{2^2}$ and $\sqrt[6]{3}$, which is $\sqrt[6]{8}$ and $\sqrt[6]{9}$; multiplied together, they become $\sqrt[6]{72}$, &c.

SECT. II. EQUATIONS, or the application of the foregoing general rules to the solution of various kinds of problems.

The word equation implies no more than simply the

making one thing equal to another, or asserting it to be so, if the assertion is really true; and, in fact, it is by this very simple operation that the most abstruse and difficult algebraic problems are resolved. The method of noting down equations, or making the affirmation of equality, is by writing down the two quantities, with $=$, the sign of equality, between them; and the quantities are then called the two different sides of the equation. Thus, $a+b=c$; that is, the sum of a and b is equal to the quantity c , where $a+b$ are one side of the equation, and c is the other: $4+5=6=3$. Here, $4+5=6$ are one side, and 3 is the other side, of the equation.

It is needless to observe, that no problem can be resolved by making false equations, or affirming a thing to be equal to what it is not: but tho' this will never be done intentionally, it is very often done by mistake; and to prevent mistakes of this kind, it will be always necessary to keep in view the following self-evident axioms.

Equations.

Axioms.

1. If equal quantities are added to equal quantities, the sums will be equal. Thus, if a bottle contains a gallon of water, and a cask contains another gallon; if a third gallon is poured into the bottle, and a fourth one into the cask, there will be equal quantities of water in the bottle and the cask.

2. If equal quantities are subtracted from, multiplied into, or divided by, equal quantities; the remainders, products, or quotients, will be equal.

In conformity to these axioms, it is plain, that an algebraist may do what he pleases with his equations, provided he does the same thing with both sides of them: thus, if $a=4$, I may then say $2a=8$, $7a=28$, $a-4=4-4=0$; or $a+2=2$, $a+4=1$, $a+8=0,5$, &c. where every one of these equations is as true as the first; because what is done to one side of the equation is likewise done to the other: but if I either add, subtract, multiply, or divide, one side, without doing so to the other, I evidently affirm a falsehood; for if $a=4$, then it is plain that if I multiply one side by 2, and only add 2 to the other, I make $2a=6$, or say that twice four is six.

As there is no science whatever wherein people are more liable to mistake, and to perplex themselves, than algebraic operations, it will be very proper for young algebraists to number the steps of their operation, and on the left-hand margin to mark what is done in each step, that a more full and distinct view of the whole may be at once obtained, and any mistake more easily corrected, as in the following example.

	1	$a=6$
1×2	2	$2a=12$
$2+b$	3	$2a+b=12+b$
$2+1$	4	$\frac{2a}{a} = \frac{12}{6}$
$2 \div 1$	5	$4a^2=144$, &c.

Here the figures on the margin denote what is done with each preceding step, or equation; 1×2 denotes that the first equation is multiplied, not by the second equation, but by the number 2; which, for this reason, has a line drawn over it: $2+b$ signifies, that b is added to both sides of the second equation: $2+1$ signifies, that both sides of the second equation are divided by both sides of the first: $2 \div 1$, that both sides of the second equation are involved to the second power or square

Meaning of the term equation.

Equations. square, &c.

In all equations there are some quantities supposed to be known, and others unknown: the design of the equation is to discover the value of the unknown quantities; in order to which they must be compared with those quantities which are known; for if the equation consists only of unknown quantities, it is impossible to know any thing about them.

14
Reduction
of equations

The end proposed in every equation is to place the unknown quantities all by themselves on one side of the equation, and the known ones by themselves on the other: when this is done, the equation is said to be *reduced*, and the operation is at an end.

15
By transposition.

Equations may be reduced, (1.) By addition and subtraction; or, as it is commonly called, by *transposition*. This is performed by adding to, or subtracting from, both sides of the equation, a quantity with which it is encumbered, and which tends to obscure the true meaning. Thus, $x+6=7$; here the unknown quantity x is combined, by addition, with 6 a known one; which I want to get clear of, that I may know the precise value of x . For this purpose I make an equation of $6=6$, which I subtract from the former, and the work stands thus.

$$\begin{array}{r|l} 1 & x+6=7 \\ 2 & 6=6 \\ \hline 1-2 & 3 \quad x=7-6=1 \end{array}$$

Here I find the true value of x , because it stands alone upon one side, and a known quantity stands alone on the other. It is evident also, that if, instead of writing down the equation $6=6$, I only change the sign of the known quantity, and carry it over to the other side of the equation with the sign so changed, the event will be the same; for, if $x+6=7$, then undoubtedly $x=7-6$, or $6=7-x$. It is a rule, therefore, in algebra, That whatever quantity is carried over from one side of an equation to another, must have its sign changed, whether it was + or -, and whether the quantity be known or unknown; it will then produce the effects of a positive or negative quantity, among those to which it is carried, according as the sign is changed from - to +, or from + to -. Suppose the following equation given,

$$\begin{array}{r|l} 1 & 3x+5=2x+6 \\ 1-2x & 2 \quad x+5=6 \\ 2-\frac{5}{3} & 3 \quad x=1 \end{array}$$

The reason of this operation is obvious: for carrying over $2x$ with its sign changed, it meets with $3x$, which it destroys as far as it can; the remainder is then only x , which being still combined with 5, makes the transposition again necessary, as in the former example.

16
By division.

(2.) When the unknown quantity is combined with any known one by multiplication, it is necessary to divide both sides of the equation by that quantity into which the unknown one is multiplied. Thus, suppose $4x=20$, I cannot make x stand alone upon one side of the equation, unless I divide $4x$ by 4; the quotient is x ; and dividing the other side also by 4, we have $x=5$. In like manner, if $4x-2=8$, then, by transposition, $4x=8+2=10$, and, by division, $x=\frac{10}{4}=2,5$, &c.

17
By multiplication.

(3.) If the unknown quantity is divided by any known one, both sides of the equation must be multiplied by that quantity which divides the unknown one,

in order to take away the fraction, without which Equations.

the equation could not be conveniently reduced. With regard to fractional quantities, according to the rules of arithmetic, it is the same thing to multiply a fraction by its denominator, and merely to throw away that denominator; hence, if one side of an equation is divided by any quantity, and not another, it will be sufficient to multiply by the dividing quantity that side of the equation which is not affected by it. This is equally evident with any of the former methods of

reduction; for if $\frac{x}{2}=4$, then it is plain, that $x=8$, and

so of others. If several fractional quantities occur in one, or both sides of the equation, the same operation must be repeated with every one of them, as

$$\frac{x}{2} + \frac{x}{3} + \frac{x}{4} = 6; \text{ then } x + \frac{2x}{3} + \frac{2x}{4} = 12; \text{ and } 3x + 2x, \text{ or } \frac{5x}{2} = 12$$

$$5x + 6x = 36, \text{ and } 20x + 6x = 144; \text{ whence, by division, } x = 144 \div 26 = 5,5385, \text{ nearly.}$$

(4.) Reduction by involution takes place when the unknown quantity is under the radical sign. In this case, in order to come at its value, both sides of the equation must be involved to the power expressed by the index of the surd quantity, as $\sqrt{x}=4$; then, $x=16$, by involving both sides of the equation to the square; if $\sqrt[3]{x}=3$, then $x=27$, &c.

These are all the methods of reduction that are applicable to simple equations, or those where the unknown quantity is not multiplied by itself; in which case, very different methods are to be used, which shall be explained under quadratic, cubic, &c. equations: we must now take notice of the preliminary steps necessary to be taken in order to the solution of an algebraic problem.

The first thing to be done is to state the question, as it is called; or to write down in algebraic characters what is before expressed in the words at length. This will be most easily understood by the following example.

It is required to find a number, which being multiplied by 5, and 8 subtracted from the product, the remainder shall be 52.—As the thing here sought is only one number, I put x , or any letter at pleasure, for it: then, as the question intimates that the number sought is multiplied by 5, and 8 subtracted from the product, I do the same with the letter taken to represent it; and find the remainder to be $5x-8$: this therefore, by the question, being equal to 52, I write it down in algebraic characters, thus, $5x-8=52$. By transposition $5x=52+8=60$; and by division, $x=60 \div 5=12$, the number sought.

When only one thing is sought, generally the solution of algebraic problems is not difficult; but when two or more things are required to be discovered, the difficulty becomes proportionably greater. It is necessary, however, that where there are two or more unknown quantities, there should be data sufficient to find them all out; because questions proposed without sufficient data, cannot be resolved but in an indeterminate manner. Thus, if it be required to find two numbers x and y , with this single condition, that their sum shall be 100; it is evident, that the question is capable of 99 different answers, each of which shall fulfil

18
Method of
stating or
writing
down an al-
gebraic prob-
lem.

Equations. fil the condition required; for x may be 1, and y 99; or x may be 2, and y 98, &c. but if to the foregoing condition I add another, namely, that the difference of the two numbers required is 50, the question is then properly limited, and capable only of one direct answer. If a third condition is required, suppose, that their product should be 740; this condition is either superfluous, because the values of x and y may be found without it; or absurd, as being inconsistent with the rest. It is therefore a general rule in algebra, That where there are two unknown quantities, the problem must be laid down in such a manner as to admit of two equations being formed from it, which shall neither be inconsistent with, nor consequences of, one another; for if this last is the case, it is the same thing as tho' only one equation were given: for instance, if am required to find two numbers whose sum is 100, and double their sum 200, this last equation is only the first one doubled; and consequently the question is still as unlimited as before.

39 **Extermination of unknown quantities.** For the solution of problems where two or more quantities are concerned, there is one general rule which will certainly hold in all cases, namely, to find a value of each of the unknown quantities from each of the equations, treating the other unknown quantity exactly as a known one. By this means we have two sides of a new equation, where only one unknown quantity is concerned, the other being exterminated, as it is called, by the preceding operation; and it is evident, that if the equations are consistent with one another, the value of the unknown quantity found by one equation, will be precisely equal to that found by the other. We shall illustrate this by the preceding example, which, being stated, will be $x+y=100$, and $x-y=50$. By transposing the first equation, we have $x=100-y$; and by transposing the second, $x=50+y$; it is plain, that x , though an unknown quantity, must always be equal to itself; and therefore the values of it obtained from both these equations will be equal to one another; of these therefore I form the new equation $100-y=50+y$: by transposition, we have first $100=50+2y$, and then $50=2y$; whence, by division, $25=y$, and $100-y$, or $100-25=75=x$.

The same method is to be followed when there are three, or four unknown quantities; but the operation will then be much more tedious; because, having formed a new equation in which one quantity is exterminated, we must still continue to form new ones in order to exterminate the others, as in the following example.

It is required to find three numbers whose sum is 130; if the third is multiplied by 3, and that product is subtracted from the sum of the first and second, the remainder will be 10; if the first is multiplied by 2, the second by 3, these two products are added together, and 15 subtracted from the sum, the remainder will be 7 times the third number.

Having put x, y, z , for the three numbers, the question resolves itself into the following equations.

$$\begin{cases} 1 & x+y+z=130 \\ 2 & x+y-3z=10 \\ 3 & 2x+3y-15z=7z \end{cases}$$

By transposing the first equation, we have $x=130-y-z$; by transposing the second, $x=10+3z-y$; on transposing the third, and dividing by two, we have $x=\frac{7z+15-3y}{2}$. These three values of x must neces-

arily be equal to one another; I therefore form a new equation from the first and third; then $130-y-z=\frac{7z+15-3y}{2}$. Reducing this equation by multiplication and transposition, it becomes $y=9z-245$. To have another value of y , I form a new equation from the second and third values of x , or I might for the same purpose make an equation of the first and second values of x ; this will be $10+3z-y=\frac{7z+15-3y}{2}$. Reducing this equation in the same manner as before, we have $y=5z-5$. We must now form a third equation from the two values of y already found; and thus we will have $9z-245=5z-5$; from whence, by transposition and division, we have $z=30$.

In the same manner we might now proceed to find the values of the other unknown quantities; but it is evident, that though this method must infallibly answer, a great deal of needless trouble is occasioned by it in the present case; for, if, instead of finding the three values of x , I only find one from the first equation, and substitute that in place of the letter x in the second, the quantity y will be exterminated at once. The value of x from the first equation is $x=130-y-z$, the second equation is $x+y-3z=10$; writing therefore into this equation, $130-y-z$, in place of x , we have $130-y-z+y-3z=10$, where the positive and negative y destroy one another, and the equation becomes $130-4z=10$; whence, $4z=120$, and $z=30$. But it is plain, that the remarkable success of this substitution depends entirely upon the circumstance of a single y in the second equation; for had there been $2y$ there, the same advantage would not have been derived from following this method. There can therefore be no rules laid down for obtaining the solution of algebraic problems in the most easy manner possible; these must depend on the particular circumstances of each problem; and hence there is no science where the rational faculties and ingenuity are put to a greater stretch than in algebra, and no branch of education is more proper for producing a quickness of understanding, provided the algebraist does not lose himself in the depths of his science, in which case he will be quick-sighted only to algebra itself.

As so much difficulty is occasioned by a number of unknown quantities, it will seldom be proper to state a question with two unknown quantities, where one will answer the purpose, though sometimes the unknown quantities may be made to disappear surprisingly, by proper management. On some occasions, instead of chusing a single letter to represent an unknown quantity, it will be proper to express it by a sum, or a difference; as $x+y$, or $x-y$. As an example, we shall give three methods of solving the former problem, "Required to find two numbers whose sum is 100, and difference 50." With one unknown quantity, the question is stated in the following manner.

	1	x = the least number sought.
	2	$100-x$ = the greatest
1-2	3	$100-2x=50$ = their difference by question
3+2x	4	$100=50+2x$
4-50	5	$50=2x$
5÷2	6	$25=x$ the least number sought
	7	$100-x=100-25=75$, the greatest number

With two unknown quantities this may be solved otherwise

Equations.

39 **Extermination by substitution.**

Equations. therwise than by forming a new equation, thus :

$$\begin{array}{rcl} 1 & x = \text{greatest number} \\ 2 & y = \text{least} \\ 3 & x+y=100 \\ 4 & x-y=50 \end{array} \left. \vphantom{\begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array}} \right\} \text{by question}$$

$$\begin{array}{rcl} 3+4 & 5 & 2x=150 \\ 5+2 & 6 & x=75 \\ 3-4 & 7 & 2y=50 \\ 7+2 & 8 & y=25 \end{array}$$

Representing one of the numbers by a sum, and the other by a difference, the work will stand thus :

$$\begin{array}{rcl} 1 & x+y = \text{greatest number} \\ 2 & x-y = \text{least} \\ 1+2 & 3 & 2x=100, \\ 1-2 & 4 & 2y=50 \end{array} \left. \vphantom{\begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array}} \right\} \text{by question}$$

$$\begin{array}{rcl} 3+2 & 5 & x=50 \\ 4+2 & 6 & y=25 \\ 7 & x+y=75 \\ 8 & x-y=25 \end{array}$$

Though this problem is so easily resolved by all the three methods, that it is difficult to say which has the advantage; yet it is sufficient to shew the prodigious diversity of operation that must occur in the solution of algebraic problems, according as we use different methods. The last method is exceedingly proper, where equations have to be multiplied into one another, which is the origin of quadratic, cubic, and other high equations, of which we are now to treat.

21
Quadratic
equations.

If an equation is multiplied into itself once, the produce is another equation, which is as strictly just as the former: but after having reduced it by all the methods proposed for the reducing simple equations, and having brought the unknown quantities to one side, and the known ones to the other, we are still at a loss; because the unknown quantity being multiplied into itself, we know not what relation it bears to the known one. Thus, if the equation $a=12$ is multiplied once into itself, the produce is $a^2=144$; where the unknown quantity cannot be discovered till we know what number multiplied into itself will produce 144. The above equation is one of that kind called *quadratic* equations; and, from its consisting only of the literal quantity multiplied into itself, is called a *simple* quadratic: but if we multiply the equation $a+3=15$ once into itself, the product is $a^2+6a+9=225$; and reducing this by transposition, we have $a^2+6a=216$, where the literal quantity is not only multiplied by itself, but by the number 6. This addition is called the *affectation* of an equation, and the last mentioned one is of that kind called *quadratic affected equations*.

It is not to be supposed that any person would produce equations of this kind by multiplying such simple ones as those above mentioned; but very often the circumstances of the question oblige him to state them in this manner, or they are unavoidably multiplied in the course of the operation. Thus, suppose it is required to find two numbers whose sum is 100, and product 1875; by the common method, we have $x+y=100$, and $xy=1875$. From the first equation $x=100-y$, and from the second $x=\frac{1875}{y}$, whence $100-y=\frac{1875}{y}$. Reducing this, we have $100y-y^2=1875$. We do not get clear of this difficulty by using only one unknown quantity; for putting x for the one, and $100-x$ for the o-

ther, we come at once to the equation $100x-x^2=1875$. Neither is it to be totally avoided by making $x+y=$ one of the numbers, and $x-y=$ the other; thus indeed, by the question, we have $2x=100$, and $x-y=1875$; whence, by substituting the value of x , we have $y^2=625$; so that, though the equation is now only a simple quadratic, we must still remain ignorant of the value of y , till we know what number multiplied into itself will produce 625. Here, however, we see the utility of sometimes representing unknown quantities by a sum and a difference.

We have already observed, that, when literal powers are to be divided by one another, the division is performed by subtracting their indices. The extraction of their roots, in like manner, is performed by dividing their indices by 2, 3, 4, &c. according as we want the square, cube, or biquadrate root; so, if required to find the square root of a^8 , I divide its index 8 by 2, the quotient a^4 is the root required. If the root of any series of terms is required, as of x^2+6x+9 , we must proceed to find it by supposing it to be $a+b$. This root we involve to the square, and then make the following equation $a^2+2ab+b^2=x^2+6x+9$. From this it is evident, that if a^2 corresponds with x^2 , $2ab$ must correspond with $6x$, and b^2 to 9; therefore, as x is the first term of the root, and corresponds with a , the coefficient of x must correspond with $2b$ the coefficient of a . Dividing, therefore, the coefficient of x in the second term by 2, the quotient 3 is the second term of the root, and the square root of x^2+6x+9 is $x+3$. Hence we have an easy rule for completing an imperfect square, viz. to take half the coefficient of the unknown quantity, multiply it by itself, and add it to both sides of the equation, which will then be exact squares. Thus the affected quadratics are easily reduced to simple ones, as in the following example. Suppose, $x^2+14x=32$, then taking the half of 14 or 7, multiplying it by itself, and adding it to both sides of the equation, we have $x^2+14x+49=81$. From the foregoing example we are sure that the root of the literal part is $x+7$, and from the multiplication table we know that 9 multiplied into itself produces 81. Extracting the root on both sides, therefore, we have $x+7=9$; whence $x=2$.

As long as the root of the number sought does not exceed some of the 9 digits, there is no difficulty; but supposing it to consist of many places of figures, a tedious operation is required, which will be best understood by an example. Suppose the following equation is given; $x^2=2985984$, I take $x=a+b$; whence $x^2=a^2+2ab+b^2$, which consequently must be equal to the number given. The extraction of the root is now facilitated by the following consideration, that no digit multiplied into itself can produce more than two places of figures. To ascertain the number of places therefore in the root of the abovementioned number, I place a point over every third figure, beginning at the right hand, and the equation will stand thus:

$$a^2+2ab+b^2=2985984.$$

Hence I conclude, that the root required must consist of 4 places of figures, or be above 1000. I next consider what digit multiplied into itself will produce the nearest figure under 2, the first figure of the power. Had the point been placed over the second figure, I must

Equations. must have considered what digit multiplied into itself would have produced the nearest square under the first two figures. In the present case, I find it to be 1. I therefore suppose $a=1000$; multiply it by itself, and subtract it from the power, in the following manner:

$$\begin{array}{r} a^2+2ab+b^2=2985984 \quad (1000=a \\ a^2=1000000 \end{array}$$

$$2ab+b^2=1985984$$

It now appears, that if this remainder was divided by $2a+b$, the quotient must be b ; for $2a+b \times b=2ab+b^2$. But as b is still unknown, I must first proceed with $2a$, as in common division: but as it has something to be added, I must have regard to this in chusing the quotient figure; therefore, though in common division I might chuse 8 for the quotient, I only chuse 7, a being $=1000$, $2a=2000$; and to find the other term b , the work will stand thus:

$$\begin{array}{r} 2a=2000 \\ b=700 \\ 2a+b=2700 \end{array} \left. \begin{array}{l} 1985984 \quad (700=b \\ 1890000 \\ \hline 2ab+b^2 \end{array} \right\} 95984$$

To find the other figures of the root, I must now suppose $a=1700$; in which case, the former $a^2+2ab+b^2$ will now only be equivalent in value to a^2 , and $95984=2ab+b^2$. The operation is now to be repeated; a being 1700 , $2a$ is 3400 ; which I set as a new divisor, and proceed as follows:

$$\begin{array}{r} 2a=3400 \\ b=20 \\ 2a+b=3420 \end{array} \left. \begin{array}{l} 95984 \quad (20=b \\ 68400 \\ \hline 2ab+b^2 \end{array} \right\} 27584$$

I now make a third supposition, of $a=1720$, and proceed as before; thus,

$$\begin{array}{r} 2a=3440 \\ b=8 \\ 2a+b=3448 \end{array} \left. \begin{array}{l} 27584 \quad (8=b \\ 27584 \\ \hline 2ab+b^2 \end{array} \right\} 0$$

Here there being no remainder, we find 1728 to be the true root of the number required; and if the above example is attended to, the reasons of the arithmetical rules given for extracting roots will be sufficiently understood. See ARITHMETIC.

22 Cubic equations. If the equations are multiplied into themselves twice, the produce is called a cubic equation; and, like the quadratic, is either simple, or affected: thus, $x^3=1728$ is a simple cubic; $x^3-10x^2+3x=997474$, $x^3+10x=104$, &c. are cubic affected equations.

The solution of simple cubic equations, or the method of extracting the cube root, will easily be understood by an example of the same kind with that by which we illustrated the extraction of the square root. If the cube root of any simple algebraic power is required, it is found by dividing the index of that power by 3, as already observed. If of any series, the root must be supposed $=a+b$, as before; then, this involved to the cube, or $a^3+3a^2b+3ab^2+b^3$, will be equal to the cube proposed. Let it be required to find the cuberoot of $x^3+18x^2+108x+216$. Here, taking $a+b$ the root required, and involving it to the cube, we have $a^3+3a^2b+3ab^2+b^3=x^3+18x^2+108x+216$. From inspection, it is evident, that if a^3 corresponds to x^3 , $3a^2b$ must cor-

respond to $18x^2$, and consequently that $b=18 \div 3=6$, the root of the cube required therefore must be $x+6$.

By attentively considering this, we may easily see how an algebraic cube can be completed. Let us suppose the equation $x^3+6x^2=32$ given, and it is required to complete the cube. Here it is plain that $b=2$, and consequently that the cube which wants the terms equivalent to $3ab^2$ and b^3 will be completed by adding them. As $b=2$, they are easily found to be $12x+8$; and adding these to both sides of the equation, we have $x^3+6x^2+12x+8=40+12x$. Both sides of this equation are complete cubes; but it is impossible to reduce an affected cubic equation by completing its cube, as we reduce a quadratic equation by completing its square: the reason is, because the square consists but of three terms; if it wants the third, that can always be made up from the known quantity with which the unknown one is multiplied in the second; if it wants both the second and the third, it is a complete square; but in a cube which consists of four terms, the unknown quantity enters into them all except the last; and therefore, if any other than the last is wanting, the unknown quantity must again be added to both sides of the equation, as in the last example. Some cases may indeed occur, as the following, where the cube can be advantageously completed. Suppose the following equation is given; $x^3+12x^2+48x=448$. As these terms are equivalent to $a^3+3a^2b+3ab^2$, and only want b^3 to make it complete, we need only take the third of the coefficient of the second term, and, involving it to the cube, add it to both sides of the equation, which will then be $x^3+12x^2+48x+64=512$. By extracting the root, we have $x+4=8$, and $x=4$. Instances of this kind, however, occur so rarely, that we should not have mentioned this had it not been to shew the reason why cubic equations cannot be solved on the same principles with quadratics.

If the cube root of a large number is to be extracted, the principles are the same with those on which the extraction of the square root depends, but the operation is more tedious. Let it be required to find the cube root of 5832 . Taking $a+b$ the root required, as before: we have then $a^3+3a^2b+3ab^2+b^3=5832$. The number of places in the root must be determined by points, as in the extraction of the square root; but for the cube they must be placed at the interval of two figures from one another, because the cube of some of the digits extends to three places of figures. I then chuse the digit which produces the cube next less than that of the first one, two, or three figures of the resolvend, according as the point happens to fall, for the significant figure of a , annexing to it as many cyphers as there are places of figures in the root; then having cubed this and subtracted it, I take $3a^2$ for a divisor, multiplying it by b , and adding $3ab^2$, and b^3 , thus:

$$\begin{array}{r} a^3+3a^2b+3ab^2+b^3=5832 \quad (10=a \\ a^3=1000 \quad 8=b \\ \hline 3a^2=300 \quad 4832 \\ \hline 3a^2b=2400 \\ 3ab^2=1920 \\ b^3=512 \\ \hline 3a^2b+3ab^2+b^3=4832 \end{array}$$

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Here

Equations.

Here 18 is the root required; but had there been a remainder, a must have been taken = 180, and the operation repeated. The finding of b is attended with much more difficulty in the cube than in the square, on account of the great additions to be made; and the higher the powers, the greater is this difficulty; but as it is evident that an algebraic theorem will be sufficient direction for the extraction of every root, however high the power may be involved, we shall take no farther notice of the evolution of simple powers; only that all powers whose indices are multiples of 2 and 3, may be evolved by repeated extractions of the square or cube roots: thus, if I want the biquadrate root of any power, it is obtained, by extracting the square twice; if the root of the sixth power, it may be had by extracting the square thrice, or the cube twice; of the 8th power, by extracting the square four times; of the 9th power, by extracting the cube root thrice, &c.; but the roots of the 5th, 7th, and 11th powers, can only be had by following an algebraic theorem constructed on purpose for themselves.

33
Different origins of high equations.

Hitherto we have considered cubic and other high equations as originating from a continued multiplication of one simple equation into itself; but their most common original is from the multiplication of three or more different equations into one another. Thus, if we multiply the equations $x+1=5$, $x-3=1$, $x+2=6$, into one another, the cubic equation $x^3-7x-6=30$, and by transposition $x^3-7x=36$, will be produced. Here it is observable, that this equation wants the second term, because some of the numbers combined with x are negative, and others positive, and the negative and positive ones are exactly equal to one another. Had the negative quantity been either greater or less than the two positive ones, all the three terms would have remained in the product; and hence, when we see a cubic equation without the second term, we may know that the positive and negative quantities combined with x in the simple equations, or roots, from which it is formed, have been exactly equal to one another.

Cubic equations in which the third term is wanting arise from the multiplication of a simple quadratic by $x=1$, $x=2$, $x=3$, &c. thus $x^2 \times x-1=x^3-x^2$; $x^2 \times x+2=x^3+2x^2$, &c.

We have already observed, that the higher equations are produced by the terms of a question which secretly oblige us either to state it in equations already involved, or to involve them when we attempt their reduction. An example or two, we apprehend, will here be proper. Let it be required to find two numbers, of which, if the second is subtracted from 220, and the remainder divided by the unknown number, the quotient will be the first number; also, if the second is multiplied by itself, and the original number subtracted from the product, it will be 38 times the first.

$$\left. \begin{array}{l} 1 \ x = \text{the one number,} \\ 2 \ y = \text{the other,} \\ 3 \ \frac{220-y}{y} = x \\ 4 \ y^2 - y = 38x \\ 5 \ \frac{y^2 - y}{38} = x \end{array} \right\} \text{by question.}$$

$$\begin{array}{l} 5=3 \left\{ \begin{array}{l} 6 \ y^2 - y = 220 - y \\ 7 \ \frac{38}{y} = \frac{y}{y^2 - y} = \frac{8360 - 38y}{y} \\ 8 \ y^3 - y^2 = 8360 - 38y \\ 9 \ y^3 - y^2 + 38y = 8360 \end{array} \right. \end{array}$$

By a little variation in the terms of this question, a cubic equation, in which the third term is wanting, may be produced. Suppose two numbers, x and y , are required, of which 200 divided by the second may equal the first; and the square of the second may be equal to 38 times the first + the second. Here,

$$\left. \begin{array}{l} 1 \ x = \frac{200}{y} \\ 2 \ y^2 = 38x + y \\ 3 \ y^2 - y = 38x \\ 4 \ y^3 - y^2 = x \\ 5 \ \frac{y^3 - y^2}{38} = \frac{200}{y} \\ 6 \ \frac{y^3 - y^2}{38} = 200 \\ 7 \ y^3 - y^2 = 7600 \end{array} \right\} \text{by question.}$$

If the simple equations, or roots, of which a cubic or other high equation is composed, are of such a nature that one of them destroys itself and becomes = 0, a new species of cubic will arise, which is capable of three different solutions, and consequently a kind of indeterminate problem. If the equation is a quadratic, it will have four solutions of this kind, of the fifth power five, and so on, the number of solutions always being expressed by the index of the power. This does not hold, however, in any other kind of equations than those where one of the original ones destroys itself; as will appear from the following examples.

If we multiply the equations $x+1=5$, $x-1=4$, and $x-4=0$, into one another, we will produce the cubic equation, $x^3-4x^2-x+4=0$; or, by transposition, $x^3-4x^2-x=-4$. Here, x may either be +1, -1, or 4; for if either of these are substituted in place of x , it answers the terms of the question. If $x=1$, then $x^3=1$; $-4x^2=-4$, and $-x=-1$; and $x^3-4x^2-x=1-4-1=-4$. If $x=-1$, then $x^3=-1$; $-4x^2=-4$, and $-x=+1$, according to the rules of subtraction; consequently $x^3-4x^2-x=-1-4+1=-4$ as the equation imports. Lastly, if $x=4$; then $x^3=4^3=64$; $-4x^2=-64$; $-x=-4$, as in the other cases. In like manner, in the equation $x^3-9x^2+26x=24$, the value of x may be either 2, 3, or 4; for if $x=2$, then $x^3=9x^2+26x=8-36+52=24$; if $x=3$, then $x^3=9x^2+26x=27-81+78=24$; and if $x=4$, then $x^3=9x^2+26x=64-144+104=24$; and so of others.

But, when cubics are formed from the multiplication of equations into one another, all of which have some positive value, it is evident, that then they can only have one true solution: and the reason is plain; because, when any of the equations destroys itself, it likewise destroys the value of all the rest, and the whole becomes = 0; and were it not that algebra can represent imaginary beings as well as real ones, there could be nothing to work upon in such a case. In such equations, the absolute number which constitutes their value is obtained from the continual multiplication of the known quantities combined with x into one another; or the last term.

Equations. term transposed. Thus in the first example, $x^3-4x^2-x+4=0$, the number $+4$ is formed by the multiplication of -1 , -1 , and -4 , wherewith x was combined, into one another; for $+1 \times -1 = -1$, and $-1 \times -4 = +4$, according to the rules of multiplication. It is not possible, therefore, but that what has multiplied, must also divide; and as the taking $x-4=0$ destroys all the product on the other side which alone could have truly limited the value of x , it is the same thing as though we had taken $x=1$, $x+1=0$, and $x-4=0$, and multiplied them all into one another, or given x three different values originally.

We shall evidently see the difference betwixt the two species of cubics just now mentioned, by another example. The equations, $x-2=1$, $x-1=2$, and $x+2=5$, produce the following; $x^3-x^2-4x+4=10$, or by transposition, $x^3-x^2-4x=6$. Here, as the number 6 is not produced by the multiplication of -1 , -2 , and $+2$, into one another, the value of x must be different from any one of them: and it is found to be so upon trial; for supposing $x=1$, then $x^3-x^2-4x=-1-1+4=2$. If $x=2$, then $x^3-x^2-4x=8-4+12=6$. If $x=+2$, then $x^3-x^2-4x=+8-4-12=-8$: but neither of these are agreeable to the terms of the question; therefore x is neither -1 , -2 , nor $+2$. But if we take $x=3$, then $x^3-x^2-4x=27-9-12=6$, according to the question; and this is therefore the only true value of x .

Having thus explained at large the origin of all the different kinds of high equations that can possibly occur (for what is said of cubics, applies equally to Biquadratics, or those of any dimension whatever), we must now give some account of the different methods of obtaining an exact solution of them with as little trouble as possible. A ready method of doing this hath always been reckoned a desideratum in algebra, and indeed is likely to continue so. From what we have already said, we hope it will be evident why a cube cannot be completed in a manner similar to that of completing the square in quadratic equations; another method hath therefore been chosen, namely, of destroying the second and third terms, and thus reducing the affected cube to a simple one.

The destruction of the second term is easily effected, and may be understood from the following considerations. (1.) In every cube whose root is a binomial, or expressible by $a+b$, the signs are all $+$; thus the cube of $a+b=a^3+3a^2b+3ab^2+b^3$. (2.) In a residual root, or $a-b$, the signs of the cube are $+$ and $-$ alternately; thus the cube of $a-b=a^3-3a^2b+3ab^2-b^3$. (3.) By adding the cube of a binomial to the cube of a residual, the second and fourth terms always destroy one another, because they have contrary signs; but the first and third remain, because their signs are like, and they can only be destroyed by subtracting the equations from one another: thus the sum of the two cubes of $a+b$, and $a-b$, is $2a^3+6ab^2$; their difference is $6a^2b+2b^3$.

It hath already been observed, that the coefficient of the second term of any cube is always equal to three times the known quantity forming one part of the root; as, if the root is $a+b$, the coefficient of a^2 in the second term will be $3b$; if the root is $x+3$, the coefficient of the second term will be $+9$; if it is $x-3$, the coefficient will be -9 , &c. Let it now be required to destroy the second term of the equation $x^3-12x^2+47x=$

—60. Here, because the sign is negative, I suppose $x=a+4$, the third part of the coefficient of the second term, and substitute this instead of x into all the terms of the equation, in the following manner:

$$\begin{array}{rcl} 1 & x^3-12x^2+47x=-60 & \text{by quest.} \\ 2 & x=a+4 & \text{by supposition.} \\ 3 & x^3=a^3+12a^2+48a+64 \\ 2\text{d } 3 & \text{and } x-12 & 4 \quad -12x=-12a-96a-192 \\ 2 \times 4 & 7 & 5 \quad 47x=47a+188 \\ 2+4 & 5 & 6 \quad x^3-12x^2+47x=a^3-a+60 \\ 1 & 6 & 7 \quad a^3-a+60=-60 \\ 7-60 & 8 & 8 \quad a^3-a=120 \end{array}$$

From this example it will easily appear when the assumed value of x ought to be a binomial, and when a residual, and the destroying the second term of any equation can never be a matter of difficulty: but the destruction of the third term, it is plain, must depend upon quite other principles; for as its sign remains always $+$ whether the root is binomial or residual, it cannot be destroyed by any addition of a positive; and as it is also generated from all the three steps of the new substitution, it is impossible to calculate matters so as to make the positive and negative terms at all times to destroy one another. In the last example, indeed, they have done so very nearly; and if the equation had been $a^3-12x^2+48x=-55$, they would have done so altogether, and the equation would have become $a^3=-125$; but this is evidently a mere accident.

A method of destroying the third term of cubics as well as the second, has been invented by Cardan. It is very laborious; however, it shews in an eminent manner the powers of algebra, and how much a dextrous management of literal quantities may conduce to the resolution of problems utterly impossible to be solved without them.

Before this method can be followed, the second term must be destroyed as we have shewn above; then x must be supposed $=y+z$, and we proceed as in the following example.

$$\begin{array}{rcl} 1 & x^3+7x=92 & \text{by question,} \\ 2 & x=y+z & \text{by supposition.} \\ 2\text{d } 3 & 3 & 3 \quad x^3=y^3+z^3+3yz \times y+z+3y^2z+3yz^2+z^3 \\ 2 \times 7 & 4 & 4 \quad 7x=7y+7z \\ 5 & 5 & 5 \quad 3yz=-7 & \text{by supposition.} \\ 5 \times y+z & 6 & 6 \quad y+z \times 3yz=-7y-7z \\ 6 \text{ substituted into } 1 & 7 & 7 \quad x^3=y^3+z^3-7y-7z \\ & 8 & 8 \quad x^3+y^3+z^3=92 \\ & 9 & 9 \quad y^3=-7+3 \\ & 10 & 10 \quad y^3=-343+27 \\ 10 \times 4 & 11 & 11 \quad 4y^3=-1372+27 \\ 1 & 12 & 12 \quad y^3+z^3=92 \\ 12 \text{d } 3 & 13 & 13 \quad y^3+3y^2z+z^3=8464 \\ 13-11 & 14 & 14 \quad y^3-21y^2z+z^3=8514,814 \\ 14 \times y^3 & 15 & 15 \quad y^3-z^3=92,275751 \\ 12+15 & 16 & 16 \quad y^3=184,275751 \\ 16 \div 2 & 17 & 17 \quad y^3=92,137876 \\ 17 \times y^3 & 18 & 18 \quad y=4,5 \text{ nearly} \\ 12-15 & 19 & 19 \quad z^3=-0,137876 \\ 19 \div 2 & 20 & 20 \quad z^3=-0,068938 \\ 20 \times y^3 & 21 & 21 \quad z=-0,5 \text{ nearly} \\ & 22 & 22 \quad y+z=4=x & \text{by second step.} \end{array}$$

In the above operation there is no difficulty, except in the assuming $3yz=-7$, after having determined

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Difficulty of destroying the third term.

Cardan's method.

The product of two numbers not limited by determined their sum.

y+z

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Solution of high equations.

25
Destruction of the second term.

Equations.

$y+z$ to be $=x$: but it must be considered, that the product of two numbers is by no means determined by their sum; for by making one of the numbers a fraction and the other an integer, by making one of them positive, and the other negative, we may fix their product, or any number of times their product, at what we please, without affecting their sum in the least. But we must be careful, if we have once assumed a sum, not to assume a difference also; for that would determine the unknown quantities. Thus, having assumed $y+z=x$, we cannot assume $y-z=$ any known quantity, because it might alter the value of y and z with regard to x ; but though we assume any imaginable product, we only alter the value of y and z with regard to one another, which is of no consequence.

From the above operation may be deduced a general rule for the solution of all cubics to which this method is applicable; which, as corrected by Mr Simon, may be expressed in the following words. "Multiply the whole value of the equation by itself; divide the product by four; to the quotient add the cube of the coefficient of x in the third term (the second being destroyed) divided by 27; extract the square root of this sum, to which add half the value of the equation, and extract the cube root of the whole. Divide, now, one third of the coefficient of x by the root just found; subtract the quotient from the divisor, and the remainder is the value of x ." For the better understanding this theorem, in the foregoing example, $x^3+7x=92$, let $a=7$, and $b=92$; then, the rule we have just now mentioned will stand thus in algebraic characters:

$$x = \frac{b}{2} + \sqrt{\frac{b^2}{4} + \frac{a^3}{27}} \quad \text{or} \quad -\frac{b}{2} + \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}$$

29
Why it will not always succeed.

Though this theorem seems capable of resolving every kind of cubic equation, yet one unlucky circumstance destroys its utility in a great many cases. For instance; let the equation $x^3-12x=-9$ be proposed. Here, according to the theorem, I multiply -9 by itself, the product is $+81$; this, divided by 4 quotes, 20,25. I now divide the cube of -12 , or -1728 , by 27; and the quotient -64 added to $+20,25$, destroys it entirely, and leaves a remainder of $-44,25$. From this the square root ought to be extracted; but this is impossible, because it is a negative quantity, and is formed neither from the multiplication of a positive into itself, nor of a negative into itself, but of a positive into a negative. Here, therefore, the operation must stop; and it is easy from this example to see when Cardan's method will succeed, and when it will not.

30
Sir Isaac Newton's method of divisors.

Other methods have been invented of solving the higher equations; but all of them are excessively laborious, and even precarious. A very ingenious method was invented by Sir Isaac Newton from finding the divisors of the absolute number by which the value of the equation is expressed; each of these was to be substituted in place of the unknown quantity, till some of them was found to answer the terms of the question.

It is easily shown, indeed, that x must always be a divisor of this number, and thus equations may be solved which could not be solved by Cardan's method; of which the last-mentioned one $x^3-12x=-9$, is an instance: for here, the only divisors of -9 are, $+1$, -1 , $+3$, -3 , and $+9$, -9 ; and substituting these succes-

sively in place of x , 3 will be found to answer, and is the true value of x . Notwithstanding this advantage, however, when the number is large, it is excessively tedious to substitute all the divisors; and indeed, as we may easily know within a figure or two of the true value, perhaps we might succeed as well by random trials as any other way. The last term, and consequently the number of divisors, however, may be lessened by changing the equation into another, wherein a binomial or residual root is put for the unknown quantity; thus, in the equation $y^4-4y^3-8y+32=0$, if $x+1$ be substituted for y , it will become $x^4-16x^3-16x^2+21=0$.

Another very curious method is, instead of substituting all the divisors of the last term, to substitute successively the terms of the arithmetical progression 2, 0, -1 , -2 , &c. with the numbers thence resulting; then find all the divisors of each of these numbers, and write them down over against the number they divide. This being done, search for one or more arithmetical progressions, either ascending or descending, whose common difference is either unity, or some divisor of the index of the highest power of x ; that term of such progression which stands over against 0, if divided by the common difference, and substituted into the equation with the sign $+$ or $-$, according as the progression from whence it was taken was ascending or descending, will be one of the roots of the equation. If x has more values than one, there will be more arithmetical progressions. Sometimes indeed there will be deceptions by this method, and progressions will appear, which do not point out the true root; but these would fail if the substitution was continued two or three steps further: an example or two will sufficiently illustrate this.

Let the equation given be $x^3+x=68$. By transposition it becomes $x^3+x-68=0$. Here I first suppose $x=2$; which being substituted, produces -58 : then I suppose $x=1$, which produces 66; if $x=0$, then -68 is produced; with -1 , then -70 is produced; with -2 , 78 is produced; and so on. Having thus made the requisite substitutions, they are wrote down with the terms of the arithmetical progression from which they are produced, on one hand, and their divisors on the other, thus:

	Divisors	Progression ascending
2	-58	1. 2. 29. &c.
1	-66	1. 2. 3. 6. 11. &c.
0	-68	1. 2. 4. 17. &c.
-1	-70	1. 2. 5. 7. &c.
-2	-78	1. 2. 3. 6. 13. &c.
-3	-98	1. 2. 7. 14. &c.

Among these divisors only one progression is discovered; and the number 4, pointing over against 0, shews 4 to be the only true root of the equation. Let now the equation $x^4+x^3-29x^2-9x+180=0$ be proposed, and the work will stand as follows.

	Divisors	Progressions
2	70	1. 2. 5. 7. 10. 14. 35. 70
1	144	1. 2. 3. 4. 6. 8. 9. 12, &c
0	180	1. 2. 3. 4. 5. 6. 9. 10, &c
-1	160	1. 2. 4. 5. 8. 10. 16. 20, &c
-2	90	1. 2. 3. 5. 6. 9. 15, &c

In this example there are four progressions, two ascending, and two descending: which show the four roots of the equation to be $+3$, $+4$, -3 , and -5 . The reason

31
Another method by finding an arithmetical progression among the divisors.

32
Why this method succeeds.

Equations. reason of our success in this method is, that all the values of x must necessarily be divisors of the absolute number by which the value of the whole equation is expressed. When x is supposed $=0$, then that number stands alone; because it cannot be affected by any of the values of x . The true roots of the equation must therefore lie in that line of divisors opposite to 0. The progressions serve to point them out; because, as $+1$, $+2$, or -1 , -2 , are successively substituted in place of 0, there is a proportionable alteration in the value of the equation, and consequently in the divisors of the number by which it is expressed; and as long as the substitution is continued, using quantities that differ by one certain increase or decrease, the same progression must continue among the divisors.

A method of depressing biquadratic equations into cubic ones was invented by Des Cartes, which is published in Simpson's algebra, together with an improvement: but as the difficulty of solving cubic equations is very little inferior to that of solving biquadratics, we think it unnecessary to take farther notice of this, or any other method that is applicable to particular cases; and shall therefore explain the method of solving equations by approximation, or by the converging series; which, though sufficiently laborious, will certainly answer in all cases, and for every kind of equation.

General method by approximation. Let the proposed equation be $x^3+10x^2+50x=2600$. Here it is plain, that x cannot much exceed 10: making trial of 11, therefore, I find it too much, so that the true value of x must lie between 10 and 11. The difference between 10 and the true root, I call e ,

which is an unknown quantity; and for the more easy finding its value, I put r for 10, and say $x=r+e$. Then,

$$\begin{array}{r|l} 1 & x^3=r^3+3r^2e+3re^2+e^3 \\ 2 & 10x^2=10r^2+20re+10e^2 \\ 3 & 50x=50r+50e \\ 1+2+3 & 4 \quad x^3+10x^2+50x=r^3+3r^2e+3re^2+e^3+10r^2+20re+10e^2+50r+50e. \end{array}$$

Because e is of small value in comparison of r , and to avoid being involved in high equations, I reject all the powers of e above the first; and having thrown them out, the equation becomes x^3+10x^2+50x , or $2600=r^3+3r^2e+10r^2+20re+50r+50e$; whence, by transposition, $2600-r^3-10r^2-50r=3r^2e+20re+50e$; and, by division, $\frac{2600-r^3-10r^2-50r}{3r^2+20r+50}=e$. As

the value of r is known, I substitute that value into this new equation; and having made the division, e is found to be 0,18 nearly. Having then assumed $r=10,18$, and substituted this value into the equation instead of 10, in order to find the value of e more exactly, it will come out $-0,0005347$; which added to 10,18, gives 10,1794653; and if this value is again substituted, we will have another value of e , which will determine the root still more exactly; and so on, to as many places of decimals as we please.

It is not necessary, in the solution of equations by this method, to take r always the nearest root less than just; the same purpose will be answered by taking it more than just, making $r=e-x$; and proceeding accordingly.

A L G

ALGEDO, the running of a gonorrhoea stopping suddenly after it appears. When it thus stops, a pain reaches to the anus, or to the testicles, without their being swelled; and sometimes this pain reaches to the bladder, in which case there is an urging to discharge the urine, which is with difficulty passed, and in very small quantities at a time. The pain is continued to the bladder by the urethra; to the anus, by the acceleratory muscles of the penis; and to the testicles, by the vasa deferentia, and vesiculae seminales. In this case, calomel repeated so as to purge, brings back the running, and then all difficulty from this symptom ceases.

ALGENEB, a fixed star, of the second magnitude, in Perseus's right side; its longitude is $27^\circ, 46', 12''$, of Taurus, and its latitude $30^\circ, 05', 28''$, north, according to Mr Flamsteed's catalogue.

ALGEZIRA, a town of Andalusia in Spain, with a port on the coast of the Straits of Gibraltar. By this city the Moors entered Spain in 713; and it was taken from them in 1344, after a very long siege, remarkable for being the first in which cannon were made use of. It was called *Old Gibraltar*, and is about four leagues from the New. W. Long. 5. 2. N. Lat. 36° .

ALGHIER, or ALGERI, a town in Sardinia, with a bishop's see, upon the western coast of the island, between Safferi and Bofa. Though it is not large, it is well peopled, and has a commodious port. The coral fitted for on this coast is in the highest esteem of any in the Mediterranean. W. Long. 4. 2. Lat. 36° .

A L G

ALGIABARII, a Mahometan sect of predestinarians, who attribute all the actions of men, good or evil, to the agency or influence of God. The Algjabarii stand opposed to the Alkadarri*. They hold absolute degrees and physical premotion. For the justice of God in punishing the evil he has caused, they resolve it wholly into his absolute dominion over the creatures.

ALGIERS, a kingdom of Africa, now one of the states of Barbary.—According to the latest and best computations, it extends 460 miles in length from east to west, and is very unequal in breadth; some places being scarce 40 miles broad, and others upwards of 100. It lies between Long. $0^\circ 16'$ and $9^\circ 16' W$. and extends from Lat. $36^\circ 55'$ to $44^\circ 50' N$.—It is bounded on the north, by the Mediterranean; on the east, by the river Zaine, the ancient Tula, which divides it from Tunis; on the west, by the Mulvyra, and the mountains of Trava, which separate it from Morocco; and on the south by the Sahara, Zaara, or Numidian desert.

The climate of Algiers is in most places moderate, and that they enjoy a constant verdure; the leaves of the trees being neither parched up by heat in summer, nor nipped by the winter's cold. They begin to bud in February; in April, the fruit appears in its full bigness; and is commonly ripe in May. The soil, however, is excessively various; some places being very hot, dry, and barren, on which account they are generally suffered to lie uncultivated by the inhabitants, who are very negligent. These barren places, especially such as lie on the southern side, and are at a great distance from the soil.

* See *Alkadarri*.

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the sea, harbour vast numbers of wild creatures, as lions, tigers, buffaloes, wild boars, stags, porcupines, monkeys, ostriches, &c. On account of their barrenness, they have but few towns, and those thinly peopled; though some of them are so advantageously situated for trading with Bildulgerid and Negroland, as to drive a considerable traffic with them.

* See Mauritania.

The Algerine kingdom made formerly a considerable part of the Mauritania Tingitana², which was reduced to a Roman province by Julius Cæsar, and from him also called *Mauritania Cæsariensis*.—In our general account of Africa, we have related, that the Romans were driven out of that continent by the Vandals; these by Belisarius, the Greek emperor Justinian's general; and the Greeks in their turn by the Saracens. This last revolution happened about the middle of the seventh century; and the Arabs continued masters of the country, divided into a great number of petty kingdoms or states, under chiefs of their own choosing, till the year 1051. This year, one Abubeker-ben-Omar, or, as the Spanish authors call him, *Abu-Texefien*, an Arab of the Zinhagian tribe, being provoked at the tyranny of those despots, gathered, by the help of his marabouts or saints, a most powerful army of malcontents, in the southern provinces of Numidia and Libya. His followers were nicknamed *Marrabites*, or *Morabites*; by the Spaniards, *Almoravides*; probably from their being assembled principally by the saints who were also called *Morabites*. The khalif of Kayem's forces were at this time taken up with quelling other revolts in Syria, Mesopotamia, &c. and the Arabs in Spain engaged in the most bloody wars; so that Texefien having nothing to fear from them, had all the success he could wish against the Arabian cheyks or petty tyrants, whom he defeated in many battles, and at last drove them not only out of Numidia and Libya, but out of all the western parts, reducing the whole province of Tingitania under his dominion.

Texefien was succeeded by his son Yusef, or Joseph, a brave and warlike prince. In the beginning of his reign, he laid the foundation of the city of Morocco, which he designed to make the capital of his empire. While that city was building, he sent some of his marabouts ambassadors to Tremecen, (now a province of Algiers,) at that time inhabited by a powerful and insolent sect of Mahometans called *Zenetti*. The design of this embassy was to bring them back to what he called the *true faith*; but the *Zenetti*, despising his offers, assembled at Amaf, or Amfa, their capital, murdered the ambassadors, and invaded Joseph's dominions with an army of 50,000 men.

³ Zenetti destroyed.

The king hearing of their infamous proceedings, speedily mustered his army, and led it by long marches into their country, destroying all with fire and sword; while the *Zenetti*, instead of opposing his progress, retired as fast as possible towards Fez, in hopes of receiving assistance from thence. In this they were miserably deceived: the Fezzans marched out against them in a hostile manner; and coming up with the unhappy *Zenetti*, encumbered with their families and baggage, and ready to expire with hunger and weariness, they cut them all to pieces, except a small number who were mostly drowned in attempting to swim across a river; and some others, who, in their flight, perished by falling from the high adjacent rocks. In the mean time

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Joseph reduced their country to a mere desert; which was, however, soon peopled by a numerous colony of Fezzans, who settled there under the protection of the reigning kings. In this war it is computed that near a million of the *Zenetti*, men, women, and children, lost their lives.

The restless and ambitious temper of Joseph did not let him remain long at peace. He quickly declared war against the Fezzans, reduced them to become his tributaries, and extended his conquests all along the mediterranean. He next attacked some Arabian cheyks who had not yet submitted to his jurisdiction; and pursued them with such fury, that neither the Libyan deserts, nor ridges of the most craggy rocks, could shelter them from his arms. He attacked them in such of their retreats, castles, and fortresses, as were till then deemed impregnable; and at last subdued them, to the great grief of the other African nations, who were greatly annoyed by the ravages committed by his numerous forces.

Thus was founded the empire of the Morabites; which, however, was of no long duration; that race being in the 12th century driven out by Mohavedin, a marabout. This race of priests was expelled by Abdulac governor of Fez; and he, in the 13th century, stripped of his new conquests by the Sharifs of *Hafcen*, the descendants of Sharifs of *Hafcen* whom Abu-Texefien had formerly expelled.

⁴ Sharifs of Hafcen who.

The better to secure their new dominions, the Sharifs divided them into several little kingdoms or provinces; and among the rest the present kingdom of Algiers was divided into four, namely, *Tremecen*, *Tenez*, *Algiers proper*, and *Bujayah*. The four first monarchs laid so good a foundation for a lasting balance of power between their little kingdoms, that they continued for some centuries in mutual peace and amity; but at length the king of Tremecen, having ventured to violate some of their articles, Abul-Farez, king of Tenez, declared war against him, and obliged him to become his tributary. This king dying soon after, and having divided his kingdom among his three sons, new discords arose; which Spain taking advantage of, a powerful fleet and army was sent against Barbary, under the Count of Navarre, in 1505. This commander soon made himself master of the important cities of Oran, Bujayah, and some others; which so alarmed the Algerines, that they put themselves under the protection of Selim Eutemi, a noble and warlike Arabian prince. He came to their assistance with a great number of his bravest subjects, bringing with him his wife Zaphira, and a son then about 12 years old. This however was not sufficient to prevent the Spaniards from landing a number of forces near Algiers that same year, and obliging that metropolis to become tributary to Spain. Nor could Prince Selim hinder them from building a strong fort on a small island opposite to the city, which terrified their corsairs from sailing either in or out of the harbour.

To this galling yoke the Algerines were obliged to submit, till the year 1516; when, hearing of the death of Ferdinand king of Spain, they sent an embassy to *Aruch Barbarossa*, who was at this time no less dreaded for his valour than his surprising success, and was then sent on a cruise with a Squadron of galleys and barks. The purport of the embassy was, that he should come

⁵ Algerines in danger from the Spaniards.

⁹ Invite Barbarossa.

come

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come and free them from the Spanish yoke; for which they agreed to pay him a gratuity answerable to a great service. Upon this, Barbarossa immediately dispatched 18 gallees and 30 barks to the assistance of the Algerines; while he himself advanced towards the city with 800 Turks, 3000 Jigellites, and 2000 Moorish volunteers. Instead of taking the nearest road to Algiers, he directed his course towards *Sharshel*, where *Haffan*, another famed corsair, had settled himself. Him he surprised, and obliged to surrender; not without a previous promise of friendship: but no sooner had Barbarossa got him in his power, than he cut off his head; and obliged all *Haffan's* Turks to follow him in his new expedition.

7
His treachery and
cruelty.

On Barbarossa's approach to Algiers, he was met by prince Eutemi, attended by all the people of that metropolis, great and small; who looked for deliverance from this abandoned villain, whom they accounted invincible. He was conducted into the city amidst the acclamations of the people, and lodged in one of the noblest apartments of prince Eutemi's palace, where he was treated with the greatest marks of distinction. Elated beyond measure with this kind reception, Barbarossa formed a design of becoming king of Algiers; and fearing some opposition from the inhabitants, on account of the excellence he suffered his soldiers to commit, murdered prince Eutemi, and caused himself to be proclaimed king; his Turks and Moors crying out as he rode along the streets, "Long live King Aruch Barbarossa, the invincible king of Algiers, the *chosen of God* to deliver the people from the oppression of the Christians; and destruction to all that shall oppose, or refuse to own him as their lawful sovereign." These last threatening words so intimidated the inhabitants, already apprehensive of a general massacre, that he was immediately acknowledged king. The unhappy prince Zaphira, it is said, poisoned herself, to avoid the brutality of this new king, whom she unsuccessfully endeavoured to stab with a dagger.

Barbarossa was no sooner seated on the throne, than he treated his subjects with such cruelty, that they used to shut up their houses and hide themselves when he appeared in public. In consequence of this, a plot was soon formed against him; but being discovered, he caused twenty of the principal conspirators to be beheaded, their bodies to be buried in a dunghill, and laid a heavy fine on those who survived. This so terrified the Algerines, that they never afterwards durst attempt any thing against either Barbarossa or his successors.

In the mean time, the son of prince Eutemi having fled to Oran, and put himself under the protection of the marquis of Gomarez, laid before that nobleman a plan for putting the city of Algiers into the hands of the king of Spain. Upon this, young Selim Eutemi was sent to Spain, to lay his plan before cardinal Ximenes; who having approved of it, sent a fleet with 10,000 land forces, under the command of *Don Francisco*, or, as others call him, *Don Diego de Vera*, to drive out the Turks, and restore the young prince. But the fleet was no sooner come within sight of land, than it was dispersed by a storm, and the greatest part of the ships dashed against the rocks. Most of the Spaniards were drowned; and the few who escaped to shore, were either killed by the Turks, or made slaves.

Though Barbarossa had nothing to boast on this oc-

caſion, his pride and insolence were now swelled to such a degree, that he imagined himself invincible, and that the very elements conspired to make him so. The Arabians were so much alarmed at his success, that they implored the assistance of Hamidel Abdes king of Tenez, to drive the Turks out of Algiers. That prince readily undertook to do what was in his power for this purpose, provided they agreed to settle the kingdom on himself and his descendants. This proposal being accepted, he immediately set out at the head of 10,000 Moors; and, upon his entering the Algerine dominions, was joined by all the Arabians in the country. Barbarossa engaged him, only with 1000 Turkish musqueteers and 500 Granada Moors; totally defeated his numerous army; pursued him to the very gates of his capital, which he easily made himself master of; and, having given it up to be plundered by his Turks, obliged the inhabitants to acknowledge him as their sovereign. This victory, however, was chiefly owing to the advantage which his troops had from their fire-arms; the enemy having no other weapons than arrows and javelins.

No sooner was Barbarossa become master of the kingdom of Tenez, than he received an embassy from the inhabitants of Tremecen; inviting him to come to their assistance against their then reigning prince, with whom they were dissatisfied on account of his having dethroned his nephew, and forced him to fly to Oran; offering him even the sovereignty, in case he accepted of their proposal. The king of Tremecen, not suspecting the treachery of his subjects, met the tyrant with an army of 6000 horse and 3000 foot: but Barbarossa's artillery gave him such an advantage, that the king was at length forced to retire into the capital; which he had no sooner entered, than his head was cut off, and sent to Barbarossa, with a fresh invitation to come and take possession of the kingdom. On his approach, he was met by the inhabitants, whom he received with great complaisance, and many fair promises; but beginning to tyrannize as usual, his new subjects soon convinced him that they were not so passive as the inhabitants of Algiers. Apprehending, therefore, that his reign might prove uneasy and precarious, he entered into an alliance with the king of Fez; after which, he took care to secure the rest of the cities in his new kingdom, by garrisoning them with his own troops. Some of these, however, revolted soon after; upon which he sent one of his corsairs, named *Escaner*, a man no less cruel than himself, to reduce them. The Tremecenians now began to repent in good earnest of their having invited such a tyrant to their assistance; and held consultations on the most proper means of driving him away, and bringing back their lawful prince *Abuchen Men*: but their cabals being discovered, a great number of the conspirators were massacred in the most cruel manner. The prince had the good luck to escape to Oran, and was taken under the protection of the marquis of Gomarez, who sent immediate advice of it to Charles V. then lately arrived in Spain, with a powerful fleet and army. That monarch immediately ordered the young king a succour of 10,000 men, under the command of the governor of Oran; who, under the guidance of *Abuchen Men*, began his march towards Tremecen; and in their way they were joined by prince Selim, with a great number of Arabs and Moors. The

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first thing they resolved upon, was, to attack the important fortrels of *Calau*, situated between Tremecen and Algiers, and commanded by the corsair Efcander at the head of about 300 Turks. They invested it closely on all sides, in hopes Barbarossa would come out of Tremecen to its relief, which would give the Tremecenians an opportunity of keeping him out. That tyrant, however, kept close in his capital, being embarrassed by his fears of a revolt, and the politic delays of the king of Fez, who had not sent the auxiliaries he promised. The garrison of *Calau*, in the mean time, made a brave defence; and, in a fallly they made at night, cut off near 300 Spaniards. This encouraged them to venture a second time; but they were now repulsed with great loss, and Efcander himself wounded; soon after which, they surrendered upon honourable terms; but were all massacred by the Arabians, except sixteen, who clung close to the stirrups of the king, and of the Spanish general.

Barbarossa being now informed that Abuchen Men, with his Arabs, accompanied by the Spaniards, were in full march to lay siege to Tremecen, thought proper to come out, at the head of 1500 Turks and 5000 Moorish horse, in order to break his way through the enemy; but he had not proceeded far from the city, before his council advised him to return and fortify himself in it. This advice was now too late; the inhabitants being resolved to keep him out, and open their gates to their own lawful prince as soon as he appeared. In this distress Barbarossa saw no way left but to retire to the citadel, and there defend himself till he could find an opportunity of stealing out with his men and all his treasure. Here he defended himself vigorously; but his provisions failing him, he took advantage of a subterranean back-way, which he had caused to be digged up for that purpose, and, taking his immense treasure with him, stole away as secretly as he could. His flight, however, was soon discovered; and he was so closely pursued, that to amuse, as he hoped, the enemy, he caused a great deal of his money, plate, jewels, &c. to be scattered all the way, thinking they would not fail to stop their pursuit to gather it up. This stratagem, however, failed, through the vigilance of the Spanish commander, who being himself at the head of the pursuers, obliged them to march on, till he was come up close to him on the banks of the *Hueda*, about eight leagues from Tremecen. Barbarossa had just crossed the river with his vanguard, when the Spaniards came up with his rear on the other side, and cut them all off; and then crossing the water, overtook him at a small distance from it. Here a bloody engagement ensued, in which the Turks fought like as many lions; but, being at length overpowered by numbers, they were all cut to pieces, and Barbarossa among the rest, in the 44th year of his age, and four years after he had raised himself to the royal title of *Sigel* and the adjacent country; two years after he had acquired the sovereignty of Algiers, and scarce a twelvemonth after the reduction of Tremecen. His head was carried to Tremecen, on the point of a spear; and Abuchen Men proclaimed king, to the joy of all the inhabitants. A few days after the fight, the king of Fez made his appearance at the head of 20,000 horse, near the field of battle; but hearing of Barbarossa's defeat and death, marched off with all possible speed, to avoid being

attacked by the enemy.

The news of Barbarossa's death spread the utmost consternation among the Turks at Algiers; however, they caused his brother Hayradin to be immediately proclaimed king. The Spanish commander now sent back the emperor's forces, without making any attempt upon Algiers; by which he lost the opportunity of driving the Turks out of that country; while Hayradin, justly dreading the consequences of the tyranny of his officers, fought the protection of the Grand Signior. This was readily granted, and himself appointed bawhaw or viceroxy of Algiers; by which means he received such considerable reinforcements, that the unhappy Algerines durst not make the least complaint; and such numbers of Turks resorted to him, that he was not only capable of keeping the Moors and Arabs in subjection at home, but of annoying the Christians at sea. His first step was to take the Spanish fort abovementioned, which was a great nuisance to his metropolis. The Spaniards held out to the last extremity; but being all slain or wounded, Hayradin easily became master of the place.

Hayradin next set about building a strong mole for the safety of his ships. In this he employed 30,000 Christian slaves, whom he obliged to work without intermission for three years; in which time the work was completed. He then caused the fort he had taken from the Spaniards to be repaired, and placed a strong garrison in it, to prevent any foreign vessels from entering the harbour without giving an account of themselves. By these two important works, Hayradin soon became dreaded not only by the Arabs and Moors, but also by the maritime Christian powers, especially the Spaniards. The viceroxy failed not to acquaint the Grand Signior with his success, and obtained from him a fresh supply of money, by which he was enabled to build a stronger fort, and to erect batteries on all places that might favour the landing of an enemy. All these have since received greater improvements from time to time, as often as there was occasion for them.

In the mean time the Sultan, either out of a sense of the great services Hayradin had done, or perhaps out of jealousy lest he should make himself independent, raised Hayradin to the dignity of bawhaw of the empire, and appointed Hassan Aga, a Sardinian renegade, an intrepid warrior, and an experienced officer, to succeed him as bawhaw of Algiers. Hassan had no sooner taken possession of his new government, than he began to pursue his ravages on the Spanish coast with greater fury than ever; extending them to the ecclesiastical state, and others parts of Italy. But Pope Paul III. being alarmed at this, exhorted the emperor Charles V. to send a powerful fleet to suppress those frequent and cruel piracies; and, that nothing might be wanting to render the enterprise successful, a bull was published by his holiness, wherein a plenary absolution of sins, and the crown of martyrdom, was promised to all those who either fell in battle or were made slaves. The emperor on his part needed no spur; and therefore set sail at the head of a powerful fleet consisting of 120 ships and 20 galleys, having on board 30,000 chosen troops, an immense quantity of money, arms, ammunition, &c. In this expedition many young nobility and gentry attended as volunteers, and among these many knights of Malta, so remarkable for

Algiers.

11
Succeeded
by Hayra-
din.

12
Hertakes the
Spanish fort

13
Succeeded
by Hassan
Aga.

20
Barbarossa
defeated and
killed by the
Spaniards.

24
Charles
Vith's expedi-
tion a-
gainst Al-
giers.

for

Algiers.

for their valour against the enemies of Christianity. Even ladies of birth and character attended Charles in his expedition, and the wives and daughters of the officers and soldiers followed them with a design to settle in Barbary after the conquest was finished. All these meeting with a favourable wind, soon appeared before Algiers; every ship displaying the Spanish colours on the stern, and another at the head, with a crucifix to serve them for a pilot.

25
Algiers in
great con-
sideration.

By this prodigious armament, the Algerines were thrown into the utmost consternation. The city was surrounded only by a wall with scarce any outworks. The whole garrison consisted of 800 Turks and 6000 Moors, without fire-arms, and poorly disciplined and accounted; the rest of their forces being dispersed in the other provinces of the kingdom, to levy the usual tribute on the Arabs and Moors. The Spaniards landed without opposition, and immediately built a fort, under the cannon of which they encamped, and diverted the course of a spring which supplied the city with water. Being now reduced to the utmost distress, Hassan received a summons to surrender at discretion, on pain of being put to the sword with all the garrison. The herald was ordered to extol the vast power of the emperor both by sea and land, and to exhort him to return to the Christian religion. But to this Hassan only replied, that he must be a madman who would pretend to advise an enemy, and that the advised must still act more madly who would take counsel of such an adviser. He was, however, on the point of surrendering the city, when advice was brought him that the forces belonging to the western government were in full march towards the place; upon which it was resolved to defend it to the utmost. Charles, in the mean time, resolving upon a general assault, kept a constant firing upon the town; which, from the weak defence made by the garrison, he looked upon as already in his hands.

16
Prevented
by a mad
prophet
from sur-
rendering.

But while the *douwan*, or Algerine senate, were deliberating on the most proper means of obtaining an honourable capitulation, a mad prophet, attended by a multitude of people, entered the assembly, and foretold the speedy destruction of the Spaniards before the end of the moon, exhorting the inhabitants to hold out till that time. This prediction was soon accomplished in a very surprising and unexpected manner: for, on the 28th of October 1541, a dreadful storm of wind, rain, and hail, arose from the north, accompanied with violent shocks of earthquakes, and a dismal and universal darkness both by sea and land; so that the sun, moon, and elements, seemed to combine together for the destruction of the Spaniards. In that one night, some say in less than half an hour, 86 ships and 15 galleys were destroyed, with all their crews and military stores; by which the army on shore was deprived of all means of subsisting in these parts. Their camp also, which spread itself along the plain under the fort, was laid quite under water by the torrents which descended from the neighbouring hills. Many of the troops, by trying to remove into some better situation, were cut in pieces by the Moors and Arabs; while several galleys, and other vessels, endeavouring to gain some neighbouring creeks along the coasts, were immediately plundered, and their crews massacred by the inhabitants.

27
Spanish fleet
destroyed by
a storm.

The next morning, Charles beheld the sea covered with the fragments of so many ships, and the bodies of

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men, horses, and other creatures, swimming on the waves; at which he was so disheartened, that abandoning his tents, artillery, and all his heavy baggage, to the enemy, he marched at the head of his army, though in no small disorder, towards cape *Malabux*, in order to re-embark in those few vessels which had outweathered the storm. But Hassan, who had caused his motions to be watched, allowed him just time to get to the shore, when he fellied out and attacked the Spaniards in the midst of their hurry and confusion to get into their ships, killing great numbers, and bringing away a still greater number of captives; after which he returned in triumph to Algiers, where he celebrated with great rejoicings his happy deliverance from such distresses and danger.

Algiers.

28
Siege of Al-
giers raised.

Soon after this, the prophet *Yusef*, who had foretold the destruction of the Spaniards, was not only declared the deliverer of his country, but had a considerable gratuity decreed him, with the liberty of exercising his prophetic function unmolested. It was not long, however, before the marabouts, and some interpreters of the law, made a strong opposition against him; remonstrating to the bashaw, how ridiculous and scandalous it was to their nation, to ascribe the deliverance of it to a poor fortune-teller, which had been obtained by the fervent prayers of an eminent saint of their own profession. But tho' the bashaw and his *douwan* seemed, out of policy, to give into this last notion, yet the impression which Yusef's predictions and their late accomplishment had made upon the minds of the common people, proved too strong to be eradicated; and the spirit of divination and conjuring has since got into such credit among them, that not only their great statesmen, but their priests, marabouts, and santonos, have applied themselves to that study, and dignified it with the name of *Mahomet's Revelations*.

29
The mad
prophet re-
warded.

The unhappy Spaniards had scarce reached their ships, when they were attacked by a fresh storm, in which several more of them perished; one ship in particular, containing 700 soldiers, besides sailors, sunk in the emperor's sight, without a possibility of saving a single man. At length, with much labour, they reached the port of *Bujeyab*, at that time possessed by the Spaniards, whither Hassan king of Tunis soon after repaired, with a supply of provisions for the emperor, who received him graciously, with fresh assurances of his favour and protection. Here he dismissed the few remains of the Maltese knights and their forces, who embarked in three shattered galleys, and with much difficulty and danger reached their own country. Charles himself staid no longer than till the 16th of November, when he set sail for Carthage, and reached it on the 25th of the same month. In this unfortunate expedition upwards of 120 ships and galleys were lost, above 300 colonels and other land and sea officers, 8000 soldiers and marines, besides those destroyed by the enemy on their re-embarkation, or drowned in the last storm. The number of prisoners was so great, that the Algerines fold some of them, by way of contempt, for an onion per head.

30
Fresh cala-
mities of the
Spaniards.

Hassan, elated with this victory, in which he had very little share, undertook an expedition against the king of Tremecen, who, being now deprived of the assistance of the Spaniards, was forced to procure a peace by paying a vast sum of money, and becoming tributary

21
Hassan re-
duces Tre-
mecen.

H h

to

Algiers.

22
Bujayah taken from the Spaniards.

23
Hassan Corfo chosen bawhaw by the janissaries.

24
Superfeded by Tekelli, who puts him to a cruel death.

25
Hassan reinstated.

26
Spaniards defeated with great slaughter.

to him. The bawhaw returned to Algiers, laden with riches; and soon after died of a fever, in the 66th year of his age.

From this time the Spaniards were never able to annoy the Algerines in any considerable degree. In 1555, they lost the city of Bujayah, which was taken by *Salha Rais*, Hassan's luccessor; who next year set out on a new expedition, which he kept a secret, but was suspected to be intended against Oran: but he was scarcely got four leagues from Algiers, when the plague, which at that time raged violently in the city, broke out in his groin, and carried him off in 24 hours.

Immediately after his death the Algerine soldiery chose a Corican renegade, Hassan Corfo, in his room, till they should receive further orders from the Porte. He did not accept of the bawhawship without a good deal of difficulty; but immediately prosecuted the intended expedition against Oran, dispatching a messenger to acquaint the Porte with what had happened. They had hardly begun their hostilities against the place, when orders came from the Porte, expressly forbidding Hassan Corfo to begin the siege, or, if he had begun it, enjoining him to raise it immediately. This news was received with great grief by the whole fleet and army, as they thought themselves sure of success, the garrison being at that time very weak. Nevertheless, as they dared not disobey, the siege was immediately raised.

Corfo had hardly enjoyed his dignity four months, before news came, that eight galleys were bringing a new bawhaw to succeed him; one *Tekelli*, a principal Turk of the Grand Signior's court: upon which the Algerines unanimously resolved not to admit him. By the treachery of the Levantine soldiers, however, he was admitted at last, and the unfortunate Corfo thrown over a wall in which a number of iron hooks were fixed; one of which catching the ribs of his right side, he hung three days in the most exquisite torture, before he expired.

Tekelli was no sooner entered upon his new government, than he behaved with such cruelty and rapaciousness, that he was assassinated, even under the dome of a saint, by Yusuf Calabres, the favourite renegade of Hassan Corfo; who for this service was unanimously chosen bawhaw, but died of the plague six days after his election.

Yusef was succeeded by Hassan the son of Hayradin, who had been formerly recalled from his bawhawship, when he was succeeded by Selha-Rais; and now had the good fortune to get himself reinstated in his employment. Immediately on his arrival, he engaged in a war with the Arabs, by whom he was defeated with great loss. The next year, the Spaniards undertook an expedition against Mostagan, under the command of the count d'Alcandela; but were utterly defeated, the commander himself killed, and 12,000 taken prisoners. This disaster was owing to the inconsistency, rashness, or rather madness, of the commander; which was so great, that, after finding it impossible to rally his scattered forces, he rushed, sword in hand, into the thickest of the enemy's ranks, at the head of a small number of men, crying out, *St Jago! St Jago!* the victory is ours, the enemy is defeated; soon after which he was thrown from his horse, and trampled to death.

Hassan having had the misfortune to disoblige his

subjects by allowing the mountaineers of Cuco to buy ammunition at Algiers, was sent in irons to Constantinople, while the agn of the Janissaries, and general of the land forces, supplied his place.—Hassan easily found means to clear himself; but a new bawhaw was appointed, called Achmet; who was no sooner arrived, than he sent the two deputy-bawhaws to Constantinople, where their heads were struck off.—Achmet was a man of such insatiable avarice, that, upon his arrival at Algiers, all ranks of people came in shoals to make him presents; which he the more greedily accepted, as he had bought his dignity by the money he had amassed while head-gardener to the sultan. He enjoyed it, however, only four months; and after his death, the state was governed other four months by his lieutenant; when Hassan was a third time sent viceroy to Algiers, where he was received with the greatest demonstrations of joy.

The first enterprise in which Hassan engaged, was the siege of Marfalquiver, situated near the city Oran, which he designed to invest immediately after. The army employed in this siege consisted of 26,000 foot and 10,000 horse, besides which he had a fleet consisting of 32 galleys and galliots, together with three French vessels laden with biscuit, oil, and other provisions. The city was defended by Don Martin de Cordova, brother of the Count d'Alcandela, who had been taken prisoner in the battle where that nobleman was killed, but had obtained his liberty from the Algerines with immense sums, and now made a most gallant defence against the Turks. The city was attacked with the utmost fury by sea and land, so that several breaches were made in the walls. The Turkish standards were several times planted on the walls, and as often dislodged; but the place must have in the end submitted, had not Hassan been obliged to raise the siege in haste, on the news that the famed Genoese admiral Doria was approaching with considerable succours from Italy. The fleet accordingly arrived soon after; but missing the Algerine gallees, bore away for Pennon de Velez, where they were shamefully repulsed by an handful of Turks who garrisoned that place; which, however, was taken the following year.

In 1567, Hassan was again recalled to Constantinople, where he died three years after. He was succeeded by Mahomet, who gained the love of the Algerines by several public-spirited actions. He incorporated the Janissaries and Levantine Turks together, and by that means put an end to their dissensions, which laid the foundation of the Algerine independency on the Porte. He likewise added some considerable fortifications to the city and castle, which he designed to render impregnable. But while he was thus studying the interest of Algiers, one John Gascon, a bold Spanish adventurer, formed a design of surprising the whole piratic navy in the bay, and setting them on fire in the night-time, when they lay defenceless, and in their first sleep. For this he had not only the permission of king Philip II. but was furnished by him with proper vessels, mariners, and fireworks, for the execution of his plot. With these he set sail for Algiers in the most proper season, viz. the beginning of October, when most, if not all the ships lay at anchor there; and easily failed near enough, unsuspected, to view their manner of riding, in order to catch them napping, at a time

Algiers.

27
Hassan sent in irons to Constantinople.

28
Reinstated.

29
Siege of Marfalquiver.

30
Hassan again recalled.

31
John Gascon's bold attempt to fire the Algerine fleet.

Algiers.

Algiers.

time when the greater part of their crew were dispersed in their quarters. He came accordingly, unperceived by any, to the very mole-gate, and dispersed his men with their fire-works; but to their great surprize, they found them so ill mixed, that they could not with all their art make them take fire. In the mean time, Gascon took it into his head, by way of bravado, to go to the mole-gate, and give three loud knocks at it with the pommel of his dagger, and to leave it fixed in the gate by its point, that the Algerines might have cause to remember him. This he had the good fortune to do without meeting with any disturbance or opposition: but it was not so with his men; for no sooner did they find their endeavours unsuccessful, than they made such a bustle as quickly alarmed the guard posted on the adjacent bastion, from which the uproar quickly spread itself thro' the whole garrison. Gascon, now finding himself in the utmost danger, failed away with all possible haste: but he was pursued, overtaken, and brought back a prisoner to Mahomet; who no sooner got him into his power, than he immediately caused a gibbet of considerable height to be erected on the spot where Gascon had landed, ordering him to be hoisted up, and hung by the feet to a hook, that he might die in exquisite torture; and to shew his resentment and contempt of the king his master, he ordered his commission to be tied to his toes. He had not, however, hung long in that state, when the captain who took him, accompanied by a number of other corsairs, interceded so strongly in his behalf, that he was taken down, and put under the care of some Christian surgeons; but two days after, some Moors reporting that it was the common talk and belief in Spain, that the Algerines durst not hurt a hair of Gascon's head, &c. the unfortunate Spaniard was hoisted up by a pulley to the top of the execution-wall, and let down again upon the hook, which in his fall caught him by the belly, and gave him such a wound, that he expired without a groan.—Thus ended the expedition of John Gascon, which has procured him a place among the Spanish martyrs; while, on the other hand, the Algerines look upon his disappointment to have been miraculous, and owing to the efficacious protection of the powerful saint *Sidi Outeddeda*, whose prayers had before raised such a terrible storm against the Spanish fleet.

Mahomet, being soon after recalled, was succeeded by the famous renegade Ochali, who reduced the kingdom of Tunis; which, however, remained subject to the viceroy of Algiers only till the year 1586, when a bashaw of Tunis was appointed by the Porte.

The kingdom of Algiers continued to be governed, till the beginning of the seventeenth century, by viceroys or bashaws appointed by the Porte; concerning whom we find nothing very remarkable, further than that their avarice and tyranny was intolerable both to the Algerines and the Turks themselves. At last the Turkish Janisaries and militia becoming powerful enough to suppress the tyrannic sway of these bashaws, and the people being almost exhausted by the heavy taxes laid upon them, the former resolved to depose these petty tyrants, and set up some officers of their own at the head of the realm. The better to succeed in this attempt, the militia sent a deputation of some of their chief members to the Porte, to complain of the avarice and oppression of these bashaws, who sunk both

the revenue of the state, and the money remitted to it from Constantinople, into their own coffers, which should have been employed in keeping up and paying the soldiery; by which means they were in continual danger of being overpowered by the Arabians and Moors, who, if ever so little assisted by any Christian power, would hardly fail of driving all the Turks out of the kingdom. They represented to the Grand Vizir how much more honourable, as well as easier and cheaper, it would be for the Grand Signior to permit them to chuse their own dey, or governor, from among themselves, whose interest it would then be to see that the revenue of the kingdom was rightly applied in keeping up its forces complete, and in supplying all other exigencies of the state, without any farther charge or trouble to the Porte than that of allowing them its protection. On their part, they engaged always to acknowledge the Grand Signiors as their sovereigns, and to pay them their usual allegiance and tribute, to respect their bashaws, and even to lodge and maintain them and their retinue, in a manner suitable to their dignity, at their own charge. The bashaws, however, were, for the future, to be excluded from assisting at any but general douwans, unless invited to it; and from having the liberty of voting in them, unless when their advice was asked, or the interest of the Porte was likely to suffer by their silence. All other concerns, which related to the government of Algiers, were to be wholly left under the direction of the dey and his douwan.

These proposals having been accepted by the Porte, the deputies returned highly satisfied; and having notified their new privileges, the great douwan immediately proceeded to the election of a dey from among themselves. They compiled a new set of laws, and made several regulations for the better support and maintenance of this new form of government, to the observation of which they obliged all their subjects to swear; and the militia, navy, commerce, &c. were all settled pretty nearly on the footing upon which they now are, and which shall be afterwards described; tho' the subsequent alterations that frequently happened between the bashaws and deys, the one endeavouring to recover their former power, and the other to curtail it, caused such frequent complaints and discontents at the Ottoman court, as made them frequently repent their compliance.

In the year 1601, the Spaniards, under the command of Doria the Genoese admiral, made another attempt upon Algiers, in which they were more fortunate than usual, their fleet being only driven back by contrary winds, so that they came off without loss. In 1609, the Moors being expelled from Spain, flocked in great numbers to Algiers; and as many of them were very able sailors, they undoubtedly contributed to make the Algerine fleet so formidable as it became soon after; tho' it is probable the frequent attempts made on their city would also induce them to increase their fleet. In 1616, their fleet consisted of 40 sail of ships between 200 and 400 tons, their admiral 500 tons. It was divided into two squadrons, one of 18 sail, before the port of Malaga; and the other at the Cape of Santa Maria, between Lisbon and Seville; both of which fell foul on all Christian ships, both English and French, with whom they pretended to be in friendship, as well

32
His bravado
at the city
gate.

33
Taken and
put to death.

34
Algerines
allowed to
chuse their
own deys.

35
They grow
furni-
dable to the
Europeans.

Algiers. as Spaniards and Portuguese, with whom they were at war.

The Algerines were now become very formidable to the European powers. The Spaniards, who were most in danger, and least able to cope with them, solicited the assistance of England, the pope, and other states. The French, however, were the first who dared to shew their resentment of the perfidious behaviour of these miscreants; and in 1617, M. Beaulieu was sent against them with a fleet of 50 men of war, who defeated their fleet, took two of their vessels, while their admiral sunk his own ship and crew, rather than fall into his enemies hands.

36
An English
squadron
sent against
the Alge-
rines.

In 1620, a squadron of English men of war was sent against Algiers, under the conduct of Sir Robert Mansel: but of this expedition we have no other account, than that it returned without doing any thing; and the Algerines, becoming more and more insolent, openly defied all the European powers, the Dutch only excepted, to whom, in 1625, they sent a proposal, directed to the prince of Orange, that in case they would fit out 20 sail of ships the following year, upon any good service against the Spaniards, they would join them with 60 sail of their own.

The next year, the *Coulolies*, or *Cologlies*, (the children of such Turks as had been permitted to marry at Algiers), who were enrolled in the militia, having seized on the citadel, had well nigh made themselves masters of the city; but were attacked by the Turks and renegades, who defeated them with terrible slaughter. Many scores of them were executed; and their heads thrown in heaps upon the city-walls, without the eastern gate. Part of the citadel was blown up; and the remaining *Coulolies* were dismissed from the militia, to which they were not again admitted till long after.

37
States of
Barbary
throw off
their de-
pendence on the
Porte.

In 1623, the Algerines and other states of Barbary threw off their dependence on the Porte altogether, and set up for themselves. What gave occasion to this was the 25 years truce which Sultan Amurath IV. was obliged to make with the emperor Ferdinand II. to prevent his being overmatched by carrying on a war against him and the sophi of Persia at the same time. As this put a stop to the piratical trade of the Algerines, they proceeded as above-mentioned; and resolved, that whoever desired to be at peace with them, must distinctly and separately, apply to their government.—No sooner was this resolution taken, than the Algerines began to make prizes of several merchant ships belonging to powers at peace with the Porte. Nay, having seized a Dutch ship and poleacre at Scanderon, they ventured on shore; and finding the town abandoned by the Turkish aga and inhabitants, they plundered all the magazines and warehouses, and set them on fire.—About this time Lewis XIII. undertook to build a fort on their coasts, instead of one formerly built by the Maritians, and which they had demolished. This, after some difficulty, he accomplished; and it was called the *Bastion of France*: but the situation being afterwards found inconvenient, the French purchased the port of La Calle, and obtained liberty to trade with the Arabians and Moors. The Ottoman court, in the mean time, was so much embarrassed with the Persian war, that there was no leisure to check the Algerine piracies. This gave an opportunity to the vizir and other courtiers to compound matters with the Algerines,

and to get a share of their prizes, which were very considerable. However, for form's sake, a severe reprimand, accompanied with threats, was sent them; to which they replied, that "these depredations deserved to be indulged to them, seeing they were the only bulwark against the Christian powers, especially against the Spaniards, the sworn enemies of the Moslem name:" adding, that "if they should pay a punctilious regard to all that could purchase peace, or liberty to trade with the Ottoman empire, they would have nothing to do but set fire to all their shipping, and turn camel-drivers for a livelihood."

In the year 1635, four younger brothers of a good family in France, entered into an undertaking to despoilate, that perhaps the annals of knight-errantry can scarce furnish its equal.—This was no less than to retort the piracies of the Algerines, upon themselves; and as they indiscriminately took the ships of all nations, so were these heroes indiscriminately to take the ships belonging to Algiers; and this with a small frigate of ten guns!—In this ridiculous undertaking, 100 volunteers embarked; a Maltese commission was procured, together with an able master, and 36 mariners.—They had the good fortune, on their first setting out, to take a ship laden with wine, on the Spanish coast: with which they were so much elated, that three days after they hadly encountered two large Algerine corsairs, one of 20 and the other of 24 guns, both well manned, and commanded by able officers. These two large vessels having got the small frigate between them, plied her furiously with great shot, which soon took off her main mast: notwithstanding which, the French made so desperate a resistance, that the pirates were not able to take them, till the noise of their fire brought up five more Algerines; when the French vessel, being almost torn to pieces, was boarded and taken. The young knights-errant were punished for their temerity by a dreadful captivity, from which they redeemed themselves in 1642 at the price of 6000 dollars.

The Algerines prosecuted their piracies with impunity, to the terror and disgrace of the Europeans, till the year 1652; when a French fleet being accidentally driven to Algiers, the admiral took it into his head to demand a release of all the captives of his nation, without exception. This being refused, the Frenchman without ceremony carried off the Turkish vice-roy, and his cadí or judge, who were just arrived from the Porte, with all their equipage and retinue. The Algerines, by way of reprisal, surprised the Bastion of France already mentioned, and carried off the inhabitants to the number of 600, with all their effects; which so provoked the admiral, that he sent them word that he would pay them another visit the next year with his whole fleet.

The Algerines, undismayed by the threats of the French admiral, fitted out a fleet of 16 galleys and galliots, excellently manned and equipped, under the command of Admiral Hali Pinchinin.—The chief design of this armament was against the treasure of Loretto; which, however, they were prevented by contrary winds from obtaining. Upon this they made a descent on Puglia in the kingdom of Naples; where they ravaged the whole territory of Necotra, carrying off a vast number of captives, and among them some nuns. From thence steering towards Dalmatia, they scoured the

Algiers.

38
Desperate
undertaking
of four
younger
brothers.

39
A French
admiral
carries off
the
Turkish
basha.

40
The Alge-
rines fit out
a formidable
fleet.

Algiers.

Adriatic; and loading themselves with immense plunder, left those coasts in the utmost conflagration and resentment.

41
Which is totally destroyed by the Venetians.

At last the Venetians, alarmed at such terrible depredations, equipped a fleet of 28 fairs, under the command of admiral Capello, with express orders to burn, sink, or take, all the Barbary corsairs he met with, either on the open seas, or even in the Grand Signior's harbours, pursuant to a late treaty of peace with the Porte. On the other hand, the captain basshaw, who had been sent out with the Turkish fleet to chase the Florentine and Maltese cruisers out of the Archipelago, understanding that the Algerine squadron was so near, sent express orders to the admiral to come to his assistance. Pinchinin readily agreed; but having first resolved on a descent upon the island of Liffa, or Liffina, belonging to the Venetians, he was overtaken by Capello, from whom he retired to Valona, a sea-port belonging to the Grand Signior, whither the Venetian admiral pursued him; but the Turkish governor refusing to eject the pirates according to the articles of the peace between the Ottoman court and Venice, Capello was obliged to content himself with watching them for some time. Pinchinin was soon weary of restraint, and ventured out; when an engagement immediately ensued, in which the Algerines were defeated, and five of their vessels disabled; with the loss of 1500 men, Turks, and Christian slaves; besides 1600 galley-slaves who regained their liberty. Pinchinin, after this defeat, returned to Valona, where he was again watched by Capello; but the latter had not lain long at his old anchorage before he received a letter from the senate, desiring him to make no farther attempt on the pirates at that time, for fear of a rupture with the Porte. This was followed by a letter from the governor of Valona, desiring him to take care lest he incurred the Sultan's displeasure by such insults. The brave Venetian was forced to comply; but, resolving to take such a leave of the Algerines as he thought they deserved, observed how they had reared their tents, and drawn their booty and equipage along the shore. He then kept firing among their tents, while some well-manned galliots and brigantines were ordered among their shipping, who attacked them with such bravery, that, without any great loss, they towed out their 16 galleys, with all their cannon, stores, &c.—In this last engagement, a ball from one of the Venetian galleys happening to strike a Turkish mosque, the whole action was considered as an insult upon the Grand Signior. To conceal this, Capello was ordered to sink all the Algerine ships he had taken, except the admiral; which was to be conducted to Venice, and laid up as a trophy. Capello came off with a severe reprimand; but the Venetians were obliged to buy, with 500,000 ducats, a peace from the Porte. The Grand Signior, offered to repair the loss of the Algerines by building ten galleys for them, upon condition that they should continue in his service till the end of the ensuing summer; but Pinchinin, who knew how little the Algerines chose to lie under obligations to him, civilly declined the offer.

42
Algiers in the utmost confusion at the news.

In the mean time, the news of this defeat and loss filled Algiers with the utmost grief and confusion. The whole city was on the point of a general insurrection, when the basshaw and douwan issued out a proclamation, forbidding, not only complaints and outcries, under the

severest penalties; but all persons whatever to *take their thumbs from within their girdles*, while they were deliberating on this important point. In the mean time, they applied to the Porte for an order, that the Venetians settled in the Levant should make up their loss. But with this the Grand Signior refused to comply, and left them to repair their losses, as well as build new ships, in the best manner they could. It was not long, however, before they had the satisfaction to see one of their corsairs land, with a fresh supply of 600 slaves, whom he had brought from the coast of Iceland, whither he had been directed by a miscreant native taken on board a Danish ship.

Our pirates did not long continue in their weak and defenceless state; being able, at the end of two years, to appear at sea with a fleet of 65 sail. The admiral Pinchinin equipped four galliots at his own expence; with which, in conjunction with the Chiaiah, or secretary of the basshaw of Tripoli, he made a second excursion. This small squadron, consisting of five galleys and two brigantines, fell in with an English ship of 40 guns; which, however, Pinchinin's captains refused to engage; but being afterwards reproached by him for their cowardice, they swore to attack the next Christian ship which came in their way. This happened to be a Dutch merchantman, of 28 guns and 40 men, deeply laden, and unable to use her sails by reason of a calm. Pinchinin immediately summoned her to surrender; but, receiving an ironical answer, drew up his squadron in form of an half-moon, that they might pour their shot all at once into their adversary. This, however, the Dutchman avoided, by means of a breeze of wind which fortunately sprung up and enabled him to turn his ship; upon which the galleys ran foul of each other.—Upon this, Pinchinin ran his own galley along side of the merchantman, the upper deck of which seventy Algerines immediately took possession of, some of them cutting the rigging, and others plying the hatches with hand-grenades: but the Dutchmen having secured themselves in their close quarters, began to fire at the Algerines on board, from two pieces of cannon loaded with small shot; by which they were all soon killed, or forced to submit. Pinchinin, in the mean time, made several unsuccessful attempts to relieve his men, as well as to surround the Dutchman with his other galleys: but that ship lay so deep in the water that every shot did terrible execution among the pirates; so that they were obliged to remove farther off. At last the Dutch captain, having ordered his guns to be loaded with cartouches, gave them such a parting volley as killed 200 of them, and sent the rest back to Algiers in a most dismal plight.

But though Pinchinin thus returned in disgrace, the rest of the fleet quickly came back with vast numbers of slaves, and an immense quantity of rich spoils; insomuch that the English, French, and Dutch, were obliged to cringe to the mighty Algerines, who sometimes vouchsafed to be at peace with them, but swore eternal war against Spain, Portugal, and Italy, whom they looked upon as the greatest enemies to the Mahometan name. At last, Lewis XIV. provoked by the grievous outrages committed by the Algerines on the coasts of Provence and Languedoc, ordered, in 1681, a considerable fleet to be fitted out against them, under the marquis du Quesne, vice-admiral of France. His first

Algiers.

43
They set out a new fleet.

44
Five of their galleys defeated by a Dutch merchantman.

45
Preparations against the Algerines by Lewis XIV.

Algiers.

first expedition was against a number of Tripolitan corsairs; who had the good fortune to outrow him, and shelter themselves in the Island of Scio belonging to the Turks. This did not, however, prevent him from pursuing them thither, and making such terrible fire upon them as quickly destroyed 14 of their vessels, besides battering the walls of the castle.

46
Algiers
bombarded
and set on
fire by the
French.

This severity seemed only to be designed as a check to the piracies of the Algerines; but, finding they still continued their outrages on the French coast, he failed to Algiers in August 1682, cannonading and bombarding it so furiously, that the whole town was in flames in a very little time. The great mosque was battered down, and most of the houses laid in ruins, inasmuch that the inhabitants were on the point of abandoning the place; when on a sudden, the wind turned about, and obliged Du Quesne to return to Toulon. The Algerines immediately made reprisals, by sending a number of galleys and galliots to the coasts of Provence, where they committed the most dreadful ravages, and brought away a vast number of captives: upon which a new armament was ordered to be got ready at Toulon and Marseilles, against the next year; and the Algerines, having received timely notice, put themselves into as good a state of defence as the time would allow.

47
Algierines
commit
dreadful ra-
vages in
France.

48
The city
gain bom-
barded.

In May 1683, Du Quesne with his squadron cast anchor before Algiers; where, being joined by the Marquis D'Affranville, at the head of five stout vessels, it was resolved to bombard the town next day. Accordingly 100 bombs were thrown into it the first day; which did terrible execution, while the besieged made some hundred discharges of their cannon against them, without doing any considerable damage. The following night the bombs were again thrown into the city in such numbers, that the dey's palace and other great edifices were almost destroyed; some of their batteries were dismounted, and several vessels sunk in the port. The dey, and Turkish bashaw, as well as the whole soldiery, alarmed at this dreadful havoc, immediately sued for peace. As a preliminary, the immediate surrender was insisted on of all Christian captives who had been taken fighting under the French flag; which being granted, 142 of them were immediately delivered up, with a promise of sending him the remainder as soon as they could be got from the different parts of the country. Accordingly Du Quesne sent his commissary-general and one of his engineers into the town; but with express orders to insist upon the delivery of all the French captives without exception, together with the effects they had taken from the French; and that Mezomorto their then admiral, and Hali Rais one of their captains, should be given as hostages.

This last demand having embarrassed the dey, he assembled the douwan, and acquainted them with it: upon which Mezomorto fell into a violent passion, and told the assembly, that the cowardice of those who sat at the helm had occasioned the ruin of Algiers; but that, for his part, he would never consent to deliver up any thing that had been taken from the French. He immediately acquainted the soldiery with what had passed; which so exasperated them, that they murdered the dey that very night, and on the morrow chose Mezomorto in his place. This was no sooner done, than he cancelled all the articles of peace which had

been made, and hostilities were renewed with greater fury than ever.

49
Set on fire
and almost
destroyed.

The French admiral now kept pouring in such volleys of bombs, that, in less than three days, the greatest part of the city was reduced to ashes, and the fire burnt with such vehemence, that the sea was enlightened with it for more than two leagues round. Mezomorto, unmoved at all these disasters, and the vast number of the slain, whose blood ran in rivulets along the streets; or rather, grown furious and desperate, fought only how to wreak his revenge on the enemy; and, not content with causing all the French in the city to be cruelly murdered, ordered their confal to be tied hand and foot, and fastened alive to the mouth of a mortar, from whence he was shot away against his navy.—By this piece of inhumanity Du Quesne was so exasperated, that he did not leave Algiers till he had utterly destroyed all their fortifications, shipping, almost all the lower part, and above two thirds of the upper part, of the city; by which means it became little else than an heap of ruins.

50
Algierines
sue for
peace.

The haughty Algerines were now thoroughly convinced that they were not invincible; and, therefore, immediately sent an embassy into France, begging in the most abject terms for peace; which Lewis immediately granted, to their inexpressible joy. They now began to pay some regard to other nations, and to be a little cautious how they wantonly incurred their displeasure. The first bombardment by the French had so far humbled the Algerines, that they condescended to enter into a treaty with England; which was renewed, upon terms very advantageous to the latter, in 1686. It is not to be supposed, however, that the natural perfidy of the Algerines would disappear on a sudden: notwithstanding this treaty, therefore, they lost no opportunity of making prizes of the English ships, when they could conveniently come at them. Upon some infringement of this kind, captain Beach drove ashore and burnt seven of their frigates in 1695; which produced a renewal of the treaty five years after: but it was not till the taking of Gibraltar and Port Mahon, that Britain could have a sufficient check upon them to enforce the observation of treaties; and these have since proved such restraints upon Algiers, that they still continue to pay a greater deference to the English, than to any other European power.

51
Seven of
their ships
burnt by
capt Beach.

The present century furnishes no very remarkable events with regard to Algiers; except the taking of the famed city of Oran from the Spaniards in 1708, (which however they regained in 1737,) and the expulsion of the Turkish bashaw, and uniting his office to that of dey in 1710. This introduced the form of government which still continues in Algiers.

52
Expulsion
of the Turk-
ish bashaw.

The dey is now absolute monarch; and pays no other revenue to the Porte, than that of a certain number of fine boys or youths, and some other presents which are sent thither yearly. His own income, probably, rises and falls according to the opportunities he hath of fleecing both natives and foreigners; whence it is variously computed by different authors. Dr Shaw computes the taxes of the whole kingdom to bring into the treasury no more than 300,000 dollars; but supposes that the eighth part of the prizes, the effects of those persons who die without children, joined to the yearly contributions raised by the government, presents from foreigners,

53
Revenues,
&c. of the
Dey.

Algers. foreigners, fines and oppressions, may bring in about as much more. Both the dey, and officers under him, enrich themselves by the same laudable methods of rapine and fraud; which it is no wonder to find the common people practising upon one another, and especially upon strangers, seeing they themselves are impoverished by heavy taxes and the injustice of those who are in authority.

We have already hinted, that the first deys were selected by the militia, who were then called the *douwan*, or common-council. This elective body was at first composed of 800 militia-officers, without whose consent the dey could do nothing; and upon some urgent occasions, all the officers residing in Algiers, amounting to above 1500, were summoned to assist. But since the deys, who may be compared to the Dutch Stadtholders, have become more powerful, the *douwan* is principally composed of 30 chiah-bashaws, or colonels, with now and then the mufti and cadi upon some emergencies; and, on the election of a dey, the whole soldiery are allowed to come and give their votes. All the regulations of state ought to be determined by that assembly, before they pass into a law, or the dey hath power to put them in execution: but, for many years back, the *douwan* is of so little account, that it is only convened out of formality, and to give assent to what the dey and his chief favourites have concerted beforehand. The method of gathering the votes in this august assembly, is perfectly agreeable to the character of those who compose it. The aga, or general of the janissaries, or the president *pro tempore*, first proposes the question, which is immediately repeated with a loud voice by the chiah-bashaws, and from them echoed again by four officers called *bashaldalars*, from these the question is repeated from one member of the *douwan* to another, with strange contortions, and the most hideous growlings, if it is not to their liking. From the loudness of this growling noise, the aga is left to guess as well as he can whether the majority of the assembly are pleased or displeased with the question; and from such a preposterous method, it is not surprising that these assemblies should seldom end without some tumult or disorder. As the whole body of the militia is concerned in the election of a new dey, it is seldom carried on without blows and bloodshed: but when once the choice is made, the person elected is saluted with the words *ALLA BARICK*, "God bless you, or prosper you;" and the new dey usually causes all the officers of the *douwan*, who had opposed his election, to be strangled, filling up their places with those who had been most zealous in promoting it. From this account of the election of the deys, it cannot be expected that their government should be at all secure; and as they arrive at the throne by tumult, disorder, and bloodshed, they are generally deprived of it by the same means, scarcely one in ten of them having the good fortune to die a natural death.

In this country it is not to be expected that justice will be administered with any degree of impartiality. The Mahometan soldiery, in particular, are so much favoured, that they are seldom put to death for any crime, except rebellion; in which case, they are either strangled with a bow-string, or hanged to an iron hook. In lesser offences, they are fined, or their pay stopped; and if officers, they are reduced to the station of com-

mon soldiers, from whence they may gradually raise themselves to their former dignity. Women guilty of adultery, have a halter tied about their necks, with the other end fastened to a pole, by which they are held under water till they are suffocated. The *bastinado* is likewise inflicted for small offences; and is given either upon the belly, back, or soles of the feet, according to the pleasure of the cadi; who also the appoints the number of strokes. These sometimes amount to 200 or 300, according to the indulgence the offender can obtain either by bribery or friends; and hence he often dies under this punishment, for want of powerful enough advocates. But the most terrible punishments, are these inflicted upon the Jews, or Christians, who speak against Mahomet or his religion; in which case, they must either turn Mahometans, or be impaled alive. If they afterwards apostatize, they are burned or roasted alive; or else thrown down from the top of the city-walls, upon iron hooks, where they are caught by different parts of their body, according as they happen to fall, and sometimes expire in the greatest torments; though by accident they may be put out of pain at once, as we have already related of the Spanish adventurer John Gafcon. This terrible punishment, however, begins now to be disused.

The officer next in power to the dey is the aga of the janissaries, who is one of the oldest officers in the army, and holds his post only for two months. He is then succeeded by the chiah, or next senior officer.—During the two months in which the aga enjoys his dignity, the keys of the metropolis are in his hands; all military orders are issued out in his name; and the sentence of the dey upon any offending soldier, whether capital or not, can only be executed in the court of his palace.—As soon as he is gone through this short office, he is considered as *mazoul*, or superannuated; receives his pay regularly, like the rest of the militia, every two moons; is exempt from all further duties, except when called by the dey to assist at the grand council, to which he hath, however, a right to come at all times, but hath no longer a vote in it.—Next to the aga in dignity, is the secretary of state, who registers all the public acts; and after him are the 30 chiahs, or colonels, who sit next to the aga in the *douwan*, and in the same gallery with him. Out of this class are generally chosen those who go ambassadors to foreign courts, or who disperse the dey's orders throughout the realm.—Next to them are 800 bolluck-bashaws, or eldest captains, who are promoted to that of chiah-bashaws, according to their seniority. The oldack-bashaws, or lieutenants, are next; who amount to 400, and are regularly raised to the rank of captains in their turn, and to other employments in the state, according to their abilities. These, by way of distinction, wear a leather strap, hanging down to the middle of their back. One rule is strictly observed in the rotation of these troops from one deputy to a higher; viz. the right of seniority; one single infringement of which would cause an insurrection, and probably cost the dey his life. Other military officers of note are the *vekelars*, or purveyors of the army; the *peys*, who are the four oldest soldiers, and consequently the nearest to preferment; the *soulacks*, who are the next in seniority to them, and are part of the dey's body-guard, always marching before him when he takes the field, and distinguished.

Algers.

56
Aga of the
janissaries
and other
military officers.

54
Strange method of gathering the votes of the *douwan*.

55
Punishments, &c.

Algiers.

tinguished by their carbines and gilt scymiters, with a brass gun on their caps; the kayts, or Turkish soldiers, each band of whom have the government of one or more adowars, or itinerant villages, and collect their taxes for the dey; and the fagiards, or Turkish lance-men, 100 of whom always attend the army, and watch over the water appointed for it. To these we may add the beys, or governors of the three great provinces of the realm. All the above-mentioned officers ought to compose the great douwan or council above-mentioned; but only the 30 chiah-bahaws have a right to sit in the gallery next after the dey: The rest are obliged to stand on the floor of the hall, or council-chamber, with their arms across, and, as much as possible, without motion; neither are they permitted to enter with their swords on, for fear of a tumult. As for those who have any matters to transact with the douwan, they must stand without, let the weather be ever so bad; and there they are commonly presented with coffee by some of the inferior officers, till they are dismissed.

⁵⁷
Division of
the king-
dom.

The kingdom of Algiers is at present divided into three provinces or districts, viz. the eastern, western, and southern. The eastern or Levantine government, which is by far the most considerable of the three, and is also called *Beylick*, contains the towns of Bona, Constantina, Gigeri, Bujeyah, Steffa, Tebef, Zamoura, Biscara, and Necanz, in all which the Turks have their garri-sons: besides which, it includes the two ancient kingdoms of Cuco and Labez, though independent of the Algerine government, to whose forces their country is inaccessible; so that they still live under their own cheyks, chosen by each of their adowars or hords. To these we may add a French factory at Callo, under the direction of the company of the French Bastion.—The western government hath the towns of Oran, Tremecen, Mostagan, Tenez, and Secrelly with its castle and garri-son.—The southern government hath neither town, village, nor even a house, all the inhabitants living in tents, which obliges the bey and his forces to be always encamped.

⁵⁸
Rivers.

The most considerable rivers of Algiers are the Zha, or Ziz, which runs across the province of Tremecen, and the desert of Anguid, falling into the Mediterranean, near the town of Tabecrita, where it has the name of *Sirut*. (2.) The Haregol, supposed the *Sign* of Ptolemy, comes down from the great Atlas, crosses the desert of Anguid, and falls into the sea, about five leagues from Oran. (3.) The Mina, supposed the *Chylematis* of Ptolemy, a large river, which runs through the plains of Bathala, and falls into the sea near the town of Arzew. This river hath lately received the name of *Gena*, who rebuilt the town of Bathalah, after it had been destroyed. (4.) The Shelliff, Zilef, or Zilif, descending from the mount Gnaexeris, runs through some great deserts, the lake Titteri, the frontiers of Tremecen and Tenez, falling into the sea a little above the city of Mostagan. (5.) The Celef, supposed to be the *Carthena* of the ancients, falls into the sea, about three leagues west of Algiers, after a short course of 18 or 20 leagues. (6.) The Hued-alquivir, supposed to be the *Nalabata*, or *Najaba*, of the ancients, and called by the Europeans *Zingahir*, runs down, with a swift course, through some high mountains of Cuco, and falls into the sea near Bujeyah.

Whilst the city of Bujeyah was in the hands of the Christians, the mouth of this river was so choked up with sand, that no vessel could come up into it: but in 1555, very soon after it was taken by the Moors, the great rains swelled it to such a degree, that all the sand and mud was carried off; so that galleys, and other vessels, have ever since entered it with ease, where they lie safe from storms, and all winds, but that which blows from the north. (7.) Suf-Gemar, or Suf-Gimmar al Rummel, supposed to be the *Ampsaga* of Ptolemy, hath its source on mount Auras, on the confines of Atlas; thence runs through some barren plains, and the fruitful ones of Constantina, where its stream is greatly increased by some other rivers it receives; from thence running northward, along the ridges of some high mountains, it falls into the sea a little east of Gigeri. (8.) The Ladag, or Ludeg, runs down from mount Atlas through part of Constantina, and falls into the sea a little eastward of Bona. (9.) Guadi, or Guadel Barbar, springs from the head of Orbus, or Urbs, in Tripoli, runs through Bujeyah, and falls into the sea near Tabarea.

Besides these there are many others of less note; of which, however, we do not find that the Algerines avail themselves as they might do, their genius leading them too much to the piratical trade to mind any real advantage that might be derived from their own country. The corsairs, or pirates, form each a small republic, of which the rais or captain is the supreme bashaw; who, with the officers under him, form a kind of douwan, in which every matter relating to the vessel is decided in an arbitrary way. These corsairs are chiefly instrumental in importing whatever commodities are brought into the kingdom either by way of merchandise or prizes. These consist chiefly of gold and silver stuffs, damasks, cloths, spices, tin, iron, plated brass, lead, quicksilver, cordage, sail-cloth, bullets, cochineal, linen, tartar, alum, rice, sugar, soap, cotton raw and spun, copperas, aloes, brazil and logwood, vermilion, &c. Very few commodities, however, are exported from this part of the world; the oil, wax, hides, pulse and corn produced, being but barely sufficient to supply the country; though, before the loss of Oran, the merchants have been known to ship off from one or other of the ports of Barbary several thousand tons of corn. The consumption of oil, though here in great abundance, is likewise so considerable in this kingdom, that it is seldom permitted to be shipped off for Europe. The other exports consist chiefly in ostriches feathers, copper, rugs, silk sashes, embroidered handkerchiefs, dates, and Christian slaves. Some manufactures in silk, cotton, wool, leather, &c. are carried on in this country, but mostly by the Spaniards settled here, especially about the metropolis. Carpets are also a manufacture of the country, which, though much inferior to those of Turkey, both in beauty and fineness, are preferred by the people to lie upon, on account of their being both cheaper and softer. There are also, at Algiers, looms for velvet, tassaties, and other wrought silks; and a coarse sort of linen is likewise made in most parts of the kingdom.

The inhabitants along the sea-coasts are a mixture of different nations; but chiefly Moors and Morecos driven out of Catalonia, Arragon, and other parts of Spain. Here are also great numbers of Turks, who

come

Algiers.

⁵⁹
Harbour of
Borjeyah
cleared by
accident.

⁶⁰
Accounts of
the corsairs,
commerce,
&c.

61

Algiers.

come from the Levant to seek their fortune; as well as multitudes of Jews and Christians taken at sea, who are brought hither to be sold for slaves. The Berebers are some of the most ancient inhabitants of the country; and are supposed to be descended from the ancient Sabæans, who came hither from Arabia Felix, under the conduct of one of their princes. Others believe them to be some of the Canaanites driven out of Palestine by Joshua. These are dispersed all over Barbary, and divided into a multitude of tribes under their respective chiefs: most of them inhabit the mountainous parts; some range from place to place, and live in tents, or portable huts; others in scattered villages: they have, nevertheless, kept themselves for the most part from intermixing with other nations. The Berebers are reckoned the richest of all, go better clothed, and carry on a much larger traffic of cattle, hides, wax, honey, iron, and other commodities. They have also some artificers in iron, and some manufacturers in the weaving branch.—The name of *Bereber* is supposed to have been originally given them on account of their being first settled in some desert place. Upon their increasing in process of time, they divided themselves into five tribes, probably on account of religious differences, called the *Zinhagians*, *Musamedins*, *Zeneti*, *Hoares*, and *Gomeres*; and these having produced 600 families, subdivided themselves into a great number of petty tribes.—To these we may add the *Zuwarabs*, by European authors called *Azuagues*, or *Assagues*, who are likewise dispersed over most parts of Barbary and Numidia. Great numbers of these inhabit the mountainous parts of Cuco, Labez, &c. leading a wandering pastoral life.—But the most numerous inhabitants are the Moors and Arabians. The former are very stout and warlike, and skilful horsemen; but so addicted to robbing, that one cannot safely travel along the country at a distance from the towns without a guard, or at least a marabout or faint for a safeguard. For as they look upon themselves to be the original proprietors of the country, and not only as dispossessed by the rest of the inhabitants, but reduced by them to the lowest state of poverty, they make no scruple to plunder all they meet by way of reprisal. See *Moors*.

ALGIERS, a city, the capital of the above kingdom, is probably the ancient *Icosium*: by the Arabians called *Algessair*, or rather *Al-Jezier*, or *Al-Jezerah*, i. e. *the island*, because there was an island before the city, to which it hath been since joined by a mole. It is built on the declivity of a hill by the sea-side, in the form of an amphitheatre: at sea, it looks like the top-sail of a ship. The tops of the houses are quite flat and white; inasmuch, that when it is first discovered, one would take it to be a place where they bleach linen. One house rises above another in such a manner that they do not hinder each other's prospect. The streets are so narrow, that they will scarce admit two persons to walk a-breast, and the middle part is lower than the sides. When any loaded beasts, such as camels, horses, mules, or asses, pass along, you are forced to stand up close to the wall to let them pass by. There is but one broad street, which runs through the city from east to west, in which are the shops of the principal merchants, and the market for corn and other commodities. The lower part of the walls of the city are of hewn stone, and the upper part of brick; they are

30 feet high on the land side, and 40 towards the sea; the fosses or ditches are twenty feet broad, and seven deep. There is no sweet water in the city; and though there is a tank or cistern in every house, yet they often want water, because it rains but seldom: the chief supply is from a spring on a hill, the water of which is conveyed by pipes to above a hundred fountains, at which a bowl is fastened for the use of passengers. The common reservoir is at the end of the mole, where the ships take in their water. Every one takes his turn at these places, except the Turks, who are first, and the Jews last. There are five gates, which are open from sunrise till sun-setting; and seven forts, or castles, without the walls, the greatest of which is on the mole without the gate, all of which are well supplied with great guns. There are ten large mosques, and fifty small ones; three great colleges or public schools, and a great number of petty ones for children. The houses are square, and built of stone and brick, with a square court in the middle, and galleries all round. There are said to be about 100,000 inhabitants in the city, comprehending 5000 Jewish families, besides Christians. There are four fundics, or public inns, such as are in Turkey; and six cazernes, or barracks, for the unarm'd Turkish soldiery, which will hold six hundred each. There are no inns for Christians to lodge in; but only a few tippling-huts kept by slaves, for the accommodation of Greeks and the poorer sort of travellers, where any thing may be had for money. Here are bagnios, or public baths, in the same manner as in Turkey, at a very moderate rate. The women have baths of their own, where the men dare not come. Without the city there are a great number of sepulchres, as also cells or chapels, dedicated to marabouts, or reputed saints, which the women go to visit every Friday. The Turkish soldiers are great tyrants; for they not only turn others out of the way in the streets, but will go to the farm-houses in the country for twenty days together, living on free quarters, and making use of every thing, not excepting the women. The Algerians eat, as in Turkey, sitting cross-legged round a table about four inches high, and use neither knives nor forks; before they begin, every one says, *Be isme Allah*, "In the name of God." When they have done, a slave pours water on all their hands as they sit, and then they wash their mouths. Their drink is water, sherbet, and coffee. Wine is not allowed, though drank immoderately by some. E. Long. 3. 30. N. Lat. 36. 40.

ALGOL, a fixed star of the third magnitude, called *Medusa's Head*, in the constellation Perseus; its longitude is 21°, 50', 42", of Taurus, and its latitude 23°, 23', 47", north; according to Flamsteed's catalogue.

ALGONQUINS, a nation in North America, who formerly possessed great tracts of land along the north shore of the river St Lawrence. For a long time they had no rivals as hunters and warriors, and were long in alliance with the Iroquois; whom they agreed to protect from all invaders, and to let them have a share of their venison. The Iroquois, on the other hand, were to pay a tribute to their allies, out of the culture of the earth; and to perform for them all the menial duties, such as slaying the game, curing the flesh, and dressing the skins. By degrees, however, the Iroquois associated in the hunting matches and warlike expeditions of the

Algiers

Algonquins

Algonquias

Ali.

Algonquins; so that they soon began to fancy themselves as well qualified, either for war or hunting, as their neighbours. One winter, a large detachment of both nations having gone out a-hunting, and secured, as they thought, a vast quantity of game, six young Algonquins and as many Iroquois were sent out to begin the slaughter. The Algonquins, probably become a little jealous of their associates, upon seeing a few elks, desired the Iroquois to return, on pretence that they would have sufficient employment in slaying the game they should kill; but after three days hunting, having killed none, the Iroquois exulted, and in a day or two privately set out to hunt for themselves. The Algonquins were so exasperated at seeing their rivals return laden with game, that they murdered all the hunters in the night-time. The Iroquois dissembled their resentment; but in order to be revenged, applied themselves to study the art of war as practised among those savage nations. Being afraid of engaging with the Algonquins at first, they tried their prowess on other inferior nations, and, when they thought themselves sufficiently expert, attacked the Algonquins with such diabolical fury, as shewed they could be satisfied with nothing less than the extermination of the whole race; which, had it not been for the interposition of the French, they would have accomplished.—The few Algonquin nations that are now to be seen, seem entirely ignorant of agriculture, and subsist by fishing and hunting. They allow themselves a plurality of wives; notwithstanding which, they daily decrease in populousness, few or none of their nations containing above 6000 souls, and many of them not 2000. Their language is one of the three radical ones in North America, being understood from the river St Lawrence to the Mississippi.

ALGOR, with physicians, an unusual coldness in any part of the body.

ALGORITHM, an Arabic word expressive of numerical computation.

ALGUAZIL, in the Spanish polity, an officer whose business it is to see the decrees of a judge executed.

ALHAGI, in botany, the trivial name of a species of hedyfarum. See HEDYSARUM.

ALHAMA, a very pleasant town of the kingdom of Granada, in Spain, situated in the midst of some craggy mountains, about 25 miles S. W. of Granada, on the banks of the Rio Frio, in W. Long. 1. 10. N. Lat. 36. 59. and having the finest warm baths in all Spain. It was taken from the Moors in 1481. The inhabitants, though surpris'd, and the town without a garrison, made a gallant defence: but being at length forced to submit, the place was abandoned to the pillage of the *Christian* soldiers; who, not satisfied with an immense quantity of gold and jewels, made slaves of upwards of 3000 of the inhabitants.

ALI, gives the denomination to a sect, or division, among the Mahometans, who adhere to the right of succession of Ali, the fourth caliph, or successor of Mahomet, and the reform of Mussulmanism introduced by him. The sectaries of Ali are more particularly called *Shiites*; and stand opposed to the *Sunnites*, or sect of Omar, who adhere to the law, as left by Mahomet, and Abubeker, and Omar. Ali was cousin of Mahomet, and son-in-law of that prophet, having married his daughter Fatimah. After Mahomet's death, great dis-

putes arose about the succession: many flood for Ali; but Abubeker was preferred, and elected the first kalif. Ali took his turn, after the death of Othman.—The Persians are the chief adherents to the sect of Ali, whom they hold to have been the legitimate successor of Mahomet, and Abubeker an usurper. On the contrary, the Turks are of the sect of Omar; and hold Ali in execration, having raised a furious civil war among the Mussulmans. The distinguishing badge of the followers of Ali is a red turban, which is worn by the Persians, who are hence called in derision, by the Turks, *Kifilbachi*, q. d. *red-heads*. Ali is reputed the author of several works, particularly a Centiloquium, in great repute among the Arabs and Persians, part of which has been published in English by Mr Ockley.

ALIBI, in law: When a person pursued for the commission of a crime, libelled to have been perpetrated at a certain place, and upon a certain day, proves in his defence, that he was elsewhere at the time libelled, he is said to have proved *alibi*.

ALICANT, a large sea-port town, in the province of Valencia and territory of Segura. It is seated between the mountains and the sea, and has a castle deemed impregnable. The port is defended by three bastions furnished with artillery. To prevent the visits of the Algerine pirates, watch-towers were built to give notice of the approach of an enemy's ship. It was taken from the Moors in 1264. The castle was taken by the English in 1706, and held out a siege of two years before it was retaken by the French and Spaniards, and at last surrendered upon honourable terms, after part of the rock was blown up on which the castle stood, and the governor killed. The houses are high, and well built; and a very great trade is carried on here, particularly in wine and fruit. It is seated in the Mediterranean, on a bay of the same name, 37 miles northeast of Murcia, and 75 south of Valencia. W. Long. o. 36. N. Lat. 38. 24.

ALICATA, a mountain of Sicily, near the valleys Mazara and Noto, upon which was situated (as is generally thought) the famous Dardalion, where the tyrant Phalaris kept his brazen bull.

ALICATA, a town of Sicily, remarkable for corn and good wine. It was plundered by the Turks in 1543; and is seated on a sort of peninsula near the sea, twenty-two miles S. E. of Girgenti. E. Long. 15. 20. N. Lat. 37. 11.

ALIEN, in law, implies a person born in a strange country, not within the king's allegiance; in contradistinction to a denizen, or natural subject. The word is formed from the Latin *alius*, another; q. d. one born in another country. An alien is incapable of inheriting lands in Britain, till naturalized by an act of parliament. No alien is entitled to vote at the election of members of parliament; nor can he enjoy any office, or be returned on any jury, unless where an alien is party in a cause, when the inquest is composed of an equal number of denizens and aliens. The reasons for establishing these laws were, that every man is presumed to bear faith and love to that prince and country where he received protection during his infancy; and that one prince might not settle spies in another's country; but chiefly, that the rents and revenues of the country might not be drawn to the subjects of another. Some have thought that the laws against a-

Alibi

Alien.

liens

Alien,
Aliment.

liens were introduced in the time of Henry II. when a law was made at the parliament of Wallingford, for the expulsion of strangers, in order to drive away the Flemings and Picards introduced into the kingdom by the wars of king Stephen. Others have thought that the origin of this law was more ancient; and that it is an original branch of the feudal law: for by that law no man can purchase any lands but he must be obliged to do fealty to the lords of whom the lands are holden; so that an alien who owed a previous faith to another prince, could not take an oath of fidelity in another sovereign's dominions. Among the Romans, only the *Cives Romani* were esteemed freemen; but, when their territories increased, all the Italians were made free, under the name of *Latini*, tho' they had not the privilege of wearing gold rings till the time of Justinian. Afterwards all born within the pale of the empire were considered as citizens.

ALIEN-DUTY, an impost laid on all goods imported by aliens, over and above the customs paid for such goods imported by British, and on British bottoms.

ALIEN-PRIORIES, a kind of inferior monasteries, formerly very numerous in England, and so called from their belonging to foreign abbeyes.

ALIENATION, in law, denotes the act of making over a man's property in land, tenements, &c. to another person.

ALIENATION in mortmain, is making over lands, tenements, &c. to a body-politic, or to a religious house, for which the king's licence must first be obtained, otherwise the lands, &c. alienated will be forfeited *.

* See Mortmain.

ALIMENT, (from *alo* to nourish,) implies food both solid and liquid: from which, by the process of digestion, is prepared a very mild, sweet, and whitish liquor, resembling milk, and distinguished by the name of *chyle*; which being absorbed by the lacteal veins, by them conveyed into the circulation, and there assimilated into the nature of blood, affords that supply of nutrition which the continual waste of the body is found to require.—Next to air, food is the most necessary thing for the preservation of our bodies: and as on the choice thereof our health greatly depends, it is of great importance to understand, in general, what is the properest for our nourishment; and, in particular deviations from health, what is the best adapted to restore us. Our blood and juices naturally incline to become putrid and acrimonious: fresh chyle, duly received, prevents this destructive tendency, and preserves in them that mild state which alone consists with health. An animal diet affords the most of this bland nutritious mucilage; watery fluids dilute the too gross parts, and carry off what is become unfit for use. It is only the small portion of jelly which is separated from the farinaceous parts of vegetables, that, after being much elaborated, is converted into the animal nature; yet the use of vegetables prevents both repletion, and a too great tendency to a putrescent acrimony of the blood. In hot climates, as well as against the constitutional heat of particular persons, vegetables are demanded in the largest portion; animal substances afford the highest relish while our appetite continues, but will sate the appetite before the stomach is duly filled. Vegetables may be eaten after either flesh or fish: few herbs or fruits satiate so much as that the stomach may not be filled with them, when it is already

dy satisfied with flesh or fish; whence it may be observed, that no diet which is very nourishing can be eat to fulness, because its nutritious parts are oily and fatiating.—Health depends almost wholly on a proper crasis of the blood; and to preserve this a mixture of vegetables in some degree is always required, for a loathing is soon the consequence of animal food alone: hot acrid habits, too, receive from milk and vegetables the needful for correcting their excesses; but in cold, pituitous, and nervous habits, who want most nourishment from least digestion, and from the smallest quantity of food, animal diet is to be used more freely.

Thus much being offered as general principles with respect to the matter and quality of our aliment, the valetudinarian may easily regulate his diet with some advantage to himself by an attention to the few ensuing particulars. In winter, eat freely, but drink sparingly: roast meat is to be preferred, and what is drank should be stronger than at other seasons. In summer, let thirst determine the quantity to be drank; cold stomachs never require much: boiled meats and vegetables, if not otherwise contradicted, may now be more freely used. Lax habits require the winter's diet to be continued all the year, and rigid ones should be confined to that of summer. Fat people should fast at times, but the lean should never do so. Those who are troubled with eruptions occasioned by their food, should drink but little, and use some unaccustomed exercise. The thirsty should drink freely, but eat sparingly. In general, let moderation be observed; and tho' no dinner hath been had, a light supper is at all times to be preferred. After very high-seasoned meats, a glass of water acidulated with the acid elixir of vitriol *, or in very weak stomachs the sweet elixir of vitriol †, is far more assuaging to the work of digestion than the common method of taking brandy.

* See Pharmacy, no 438, a.
† *Ib.* —, b.

Obligation of ALIMENT, in Scots law, the natural obligation on parents to provide their children with the necessaries of life, &c. See LAW, Part III. No clxxiii. 4

ALIMONY, in law, implies that allowance which a married woman sues for, and is entitled to, upon any occasional separation from her husband *.

* See Law, Part III. No clx. 13.

ALIPILARIUS, or **ALIPILUS**, in Roman antiquity, a servant belonging to the baths, whose business it was, by means of waxen plasters, and an instrument called *collella*, to take off the hairs from the arm-pits, and even arms, legs, &c. this being deemed a point of cleanliness.

ALIPTERIUM, *axerionum*, in antiquity, a place in the ancient *palastra*, where the *athleta* were anointed before their exercises.

ALIQUNT PART, in arithmetic, is that number which cannot measure any other exactly without some remainder. Thus 7 is an aliquant part of 16; for twice 7 wants two of 16, and three times 7 exceeds 16 by 5.

ALIQUNT PART, is that part of a number or quantity, which will exactly measure it without any remainder. Thus 2 is an aliquot part of 4; 3 of 9; 4 of 16; &c.

ALISMA, or **THRUMWORT**, a genus of the polygynia order, belonging to the hexandria class of plants. Of this genus, Linnæus enumerates seven species, viz. the plantago, or great water-plantain, which grows in all the marshy parts of this country; the ranunculoides, or lesser water-plantain; the natans, or creeping water-plantain; the damasonium, or star-headed water-plantain; all which

Alites
||
Allatius.

are natives of Britain. The others, *viz.* the flava, cordifolia, and subulata, are natives of America, where they are generally found in stagnating waters, and other swampy places; so that it would be difficult to preserve them in Britain, for they will not live in the open air, and require a bog to make them thrive: but as they are plants of no great beauty or use, it is not worth while to cultivate them in this country.

ALITES, in Roman antiquity, a designation given to such birds as afforded matter of auguries by their flight.

ALKAHEST, or ALCAHEST, in chemistry, an universal menstruum capable of resolving all bodies into their first principles. Van Helmont pretended he was possessed of such a menstruum; but, however credulous people might be imposed on in his days, the notion is now become as ridiculous as the philosopher's stone, the perpetuum mobile, &c.—It is likewise used by some authors for all fixed salts volatilized.

ALKALI, in chemistry. See *ALCALI*.

ALKANET, in botany. See *ANCHUSA*.

ALKEKENGI, in botany, the trivial name of a species of physalis. See *PHYSALIS*.

ALKERMES, in pharmacy, a compound cordial medicine made in the form of a confection, deriving its name from the kermes-berries used in its composition*.

ALL-HALLOWES. See the next article.

ALL-SAINTS, in the calendar, denotes a festival celebrated on the first of November, in commemoration of all the saints in general; which is otherwise called *All-hallows*. The number of saints being so excessively multiplied, it was found too burdensome to dedicate a feast-day to each. In reality, there are not days enough, scarce hours enough, in the year, for this purpose. Hence an expedient was had recourse to, by commemorating such in the lump as had not their own days. Boniface IV. in the ninth century, introduced the feast of *All-Saints* in Italy, which was soon after adopted into the other churches.

ALL-SAINTS Bay, a spacious harbour near St Salvador in Brazil, in S. America, on the Atlantic Ocean. W. long. 40°, S. lat. 12°.

ALL-SOULS, a festival kept in commemoration of all the faithful deceased, on the second of November.

ALLA, or ALLAH, the name by which the professors of Mahometanism call the Supreme Being.

The term *alla* is Arabic, derived from the verb *alab*, to adore. It is the same with the Hebrew *Elah*, which signifies the *Adorable Being*.

ALLANTOIS, or ALLANTOIDES, a gut-shaped vesicle investing the fetus of cows, goats, sheep, &c. filled with an urinous liquor conveyed to it from the urachus.—Anatomists are not agreed whether the allantoids has any existence in the human species or not*.

ALLATIUS (Leo), keeper of the Vatican library, a native of Scio, and a celebrated writer of the 17th century. He was of great service to the gentlemen of Port Royal in the controversy they had with M. Claude touching the belief of the Greeks with regard to the eucharist. No Latin was ever more devoted to the see of Rome, or more inveterate against the Greek schismatics, than Allatius. He never engaged in matrimony, nor was he ever in orders; and Pope Alexander VII. having asked him one day, why he did not enter into orders, he answered, "Because I would be

free to marry." The pope rejoined, "If so, why do you not marry?" "Because," replied Allatius, "I would be at liberty to take orders." Thus, as Mr Bayle observes, he passed his whole life, wavering betwixt a parish and a wife; sorry, perhaps, at his death, for having chosen neither of them; when, if he had fixed upon one, he might have repented his choice for 30 or 40 years.—If we believe John Patricius, Allatius had a very extraordinary pen, with which, and no other, he wrote Greek for 40 years; and we need not be surpris'd, that, when he lost it, he was so grieved, that he could scarce forbear crying. He published several manuscripts, several translations of Greek authors, and several pieces of his own composing. In his compositions he is thought to shew more erudition than judgment: he used also to make frequent digressions from one subject to another. He died at Rome in 1669, aged 83.

ALLAY. See *ALLOY*.

ALLEGATA, a word anciently subscribed at the bottom of rescripts and constitutions of the emperors; as *signata*, or *testata*, was under other instruments.

ALLEGIANCE, in law, is the tie, or *ligamen*, which binds the subject to the king, in return for that protection which the king affords the subject. The thing itself, or substantial part of it, is founded in reason and the nature of government; the name and the form are derived to us from our Gothic ancestors. Under the feudal system, every owner of lands held them in subjection to some superior or lord, from whom or from whose ancestors the tenant or vassal had received them: and there was a mutual trust or confidence subsisting between the lord and vassal, that the lord should protect the vassal in the enjoyment of the territory he had granted him; and, on the other hand, that the vassal should be faithful to the lord, and defend him against his enemies. This obligation on the part of the vassal was called his *fidelitas* or fealty; and an oath of fealty was required by the feudal law to be taken by all tenants to their landlord, which is couched in almost the same terms as our ancient oath of allegiance: except, that in the usual oath of fealty, there was frequently a saving or exception of the faith due to a superior lord by name, under whom the landlord himself was perhaps only a tenant or vassal. But when the acknowledgement was made to the absolute superior himself, who was vassal to no man, it was no longer called the oath of fealty, but the oath of allegiance; and therein the tenant swore to bear faith to his sovereign lord, in opposition to all men, without any saving or exception: "*contra omnes homines fidelitatem fecit*." Land held by this exalted species of fealty, was called *feudum ligium*, a liege fee; the vassals *homines ligii*, or liege men; and the sovereign, their *dominus ligius*, or liege lord. And when sovereign princes did homage to each other for lands held under their respective sovereignties, a distinction was always made between *simple* homage, which was only an acknowledgement of tenure; and *liege* homage, which included the fealty before-mentioned, and the services consequent upon it. Thus, when Edward III. of England in 1329, did homage to Philip VI. of France, for his feudal dominions on that continent; it was warmly disputed of what species the homage was to be, whether *liege* or *simple* homage. But with us in Britain, it becoming a settled principle of tenure, that all lands in the king-
dom

Allay
||
Allegiance.

* See
Kermes, and
Quercus.

* See *Fetus*;
and *Comparative*
Anatomy, no 79.

dom are holden of the king as their sovereign and lord paramount, no oath but that of fealty could ever be taken to inferior lords; and the oath of allegiance was necessarily confined to the person of the king alone. By an easy analogy, the term of *allegiance* was soon brought to signify all other engagements which are due from subjects to their prince, as well as those duties which were simply and merely territorial. And the oath of allegiance, as administered in England for upwards of 600 years, contained a promise "to be true and faithful to the king and his heirs, and truth and faith to bear of life and limb and terrene honour, and not to know or hear of any ill or damage intended him, without defending him therefrom." But, at the revolution, the terms of this oath being thought perhaps to favour too much the notion of non-resistance, the present form was introduced by the convention parliament, which is more general and indeterminate than the former; the subject only promising "that he will be faithful and bear true allegiance to the king," without mentioning "his heirs," or specifying in the least wherein that allegiance consists. The oath of supremacy is principally calculated as a renunciation of the pope's pretended authority: and the oath of abjuration, introduced in the reign of King William, very amply supplies the loose and general texture of the oath of allegiance; it recognizing the right of his majesty, derived under the act of settlement; engaging to support him to the utmost of the juror's power; promising to disclose all traitorous conspiracies against him; and expressly renouncing any claim of the defendants of the late pretender, in as clear and explicit terms as the English language can furnish. This oath must be taken by all persons in any office, trust, or employment; and may be tendered by two justices of the peace to any person whom they shall suspect of disaffection. And the oath of allegiance may be tendered to all persons above the age of twelve years, whether natives, denizens, or aliens.

But, besides these *express* engagements, the law also holds that there is an *implied*, *original*, and *virtual* allegiance, owing from every subject to his sovereign, antecedently to any express promise, and although the subject never swore any faith or allegiance in form. For as the king, by the very descent of the crown, is fully invested with all the rights and bound to all the duties of sovereignty, before his coronation; so the subject is bound to his prince by an intrinsic allegiance, before the super-induction of those outward bonds of oath, homage, and fealty, which were only instituted to remind the subject of this his previous duty, and for the better securing its performance. The formal profession, therefore, or oath of subjection, is nothing more than a declaration in words of what was before implied in law. Which occasions Sir Edward Coke very justly to observe, that "all subjects are equally bounden to their allegiance, as if they had taken the oath; because it is written by the finger of the law in their hearts, and the taking of the corporal oath is but an outward declaration of the same." The sanction of an oath, it is true, in case of violation of duty, makes the guilt still more accumulated, by superadding perjury to treason: but it does not increase the civil obligation to loyalty; it only strengthens the *social* tie, by uniting it with that of *religion*.

Allegiance, both express and implied, is however distinguished by the law into two sorts or species, the one *natural*, the other *local*; the former being also perpetual, the latter temporary.

Natural allegiance is such as is due from all men born within the king's dominions immediately upon their birth. For, immediately upon their birth, they are under the king's protection; at a time too, when (during their infancy) they are incapable of protecting themselves. Natural allegiance is, therefore, a debt of gratitude; which cannot be forfeited, cancelled, or altered, by any change of time, place, or circumstance, nor by any thing but the united concurrence of the legislature. A Briton who removes to France, or to China, owes the same allegiance to the king of Britain there, as at home, and twenty years hence as well as now. For it is a principle of universal law, That the natural-born subject of one prince cannot by any act of his own, no, not by swearing allegiance to another, put off or discharge his natural allegiance to the former: for this natural allegiance was intrinsic, and primitive, and antecedent to the other; and cannot be divested without the concurrent act of that prince to whom it was first due. Indeed the natural-born subject of one prince, to whom he owes allegiance, may be entangled by subjecting himself absolutely to another: but it is his own act that brings him into those straits and difficulties, of owing service to two masters; and it is unreasonable, that, by such voluntary act of his own, he should be able at pleasure to unloose those bands by which he is connected to his natural prince.

Local allegiance is such as is due from an alien, or stranger born, for so long time as he continues within the king's dominion and protection; and it ceases, the instant such stranger transfers himself from this kingdom to another. Natural allegiance is therefore *perpetual*, and *local* temporary only; and that for this reason, evidently founded upon the nature of government, That allegiance is a debt due from the subject, upon an implied contract with the prince, that so long as the one affords protection, so long the other will demean himself faithfully. As, therefore, the prince is always under a constant tie to protect his natural-born subjects at all times and in all countries, for this reason their allegiance due to him is equally universal and permanent. But, on the other hand, as the prince affords his protection to an alien, only during his residence in this realm, the allegiance of an alien is confined (in point of time) to the duration of such his residence, and (in point of locality) to the dominions of the British empire. From which considerations, Sir Matthew Hale deduces this consequence, That, though there be an usurper of the crown, yet it is treason for any subject, while the usurper is in full possession of the sovereignty, to practice any thing against his crown and dignity: wherefore, altho' the true prince regain his sovereignty yet such attempts against the usurper (unless in defence or aid of the rightful king) have been afterwards punished with death; because of the breach of that temporary allegiance, which was due to him as king *de facto*. And upon this footing, after Edward IV. recovered the crown, which had been long detained from his house by the line of Lancaster, traitors committed against Henry VI. were capitally punished, tho' Henry had been declared an usurper by parliament.

Allegory
||
Allegro.

The *oath* of allegiance, or rather the *allegiance* itself, is held to be applicable not only to the political capacity of the king, or regal office; but to his natural person, and blood-royal: and for the misapplication of their allegiance, *viz.* to the regal capacity or crown, exclusive of the person of the king, were the Spencers banished in the reign of Edward II. And from hence arose that principle of personal attachment, and affectionate loyalty, which induced our forefathers (and, if occasion required, would doubtless induce their sons) to hazard all that was dear to them, life, fortune, and family, in defence and support of their liege lord and sovereign.

ALLEGORY, in composition, consists in chusing a secondary subject, having all its properties and circumstances resembling those of the principal subject, and describing the former in such a manner as to represent the latter. The principal subject is thus kept out of view, and we are left to discover it by reflection. In other words, an allegory is, in every respect, similar to an hieroglyphical painting, excepting only that words are used instead of colours. Their effects are precisely the same: An hieroglyphic raises two images in the mind; one seen, that represents one that is not seen: An allegory does the same; the representative subject is described, and the resemblance leads us to apply the description to the subject represented.

There cannot be a finer or more correct allegory than the following, in which a vineyard is made to represent God's own people the Jews:

"Thou hast brought a vine out of Egypt; thou hast cast out the heathen, and planted it. Thou didst cause it to take deep root, and it filled the land. The hills were covered with its shadow, and the boughs thereof were like the goodly cedars. Why hast thou then broken down her hedges, so that all that pass do pluck her? The bear out of the wood doth waste it, and the wild beast doth devour it. Return, we beseech thee, O God of hosts: look down from heaven, and behold, and visit this vine and the vineyard thy right-hand hath planted, and the branch thou madest strong for thyself." Psal. lxxx.

Nothing gives greater pleasure than an allegory, when the representative subject bears a strong analogy, in all its circumstances, to that which is represented. But most writers are unlucky in their choice, the analogy being generally so faint and obscure, as rather to puzzle than to please. Allegories, as well as metaphors and similes, are unnatural in expressing any severe passion which totally occupies the mind. For this reason, the following speech of Macbeth is justly condemned by the learned author of the *Elements of Criticism*:

Methought I heard a voice cry, Sleep no more!
Macbeth doth murder Sleep; the innocent Sleep;
Sleep that knits up the ravell'd sleeve of Care,
The birth of each day's life, fore Labour's bath,
Balm of hurt minds, great Nature's second course,
Chief nourisher in life's feast. Act. ii. Sc. 3.
But see this subject more fully treated under the article
METAPHOR and Allegory.

ALLEGRO, in music, an Italian word, denoting that the part is to be played in a sprightly, brisk, lively, and gay manner.

Piu ALLEGRO, signifies, that the part it is joined to

should be sung or played quicker; as

Poco piu ALLEGRO intimates, that the part to which it refers ought to be played or sung only a little more briskly than allegro alone requires.

ALLEIN (Joseph), the son of Tobias Allein, was born in the Devizes, in Wiltshire, in 1633, and educated at Oxford. In 1655, he became assistant to Mr Newton, in Taunton-Magdalen, in Somersetshire; but was deprived for non-conformity. He died in 1668, aged 35. He was a man of great learning, and greater charity; preferring, though a nonconformist and a severe sufferer on that account, great respect for the church, and loyalty to his sovereign. He wrote several books of piety, which are highly esteemed; but his *Alarm to unconverted sinners* is more famous than the rest. There have been many editions of this little pious work, the sale of which has been very great; of the edition 1672, there were 20,000 sold; of that 1675, with this title, *A sure guide to heaven*, 50,000. There was also a large impression of it with its first title, in 1720.

ALLEMAND, a sort of grave solemn music, with good measure, and a slow movement.—It is also a brisk kind of dance, very common in Germany and Switzerland.

ALLEMANNIC, in a general sense, denotes any thing belonging to the ancient Germans. Thus, we meet with Allemannic history, Allemannic language, Allemannic law, &c.

ALLEN (Thomas), a famous mathematician of the sixteenth century, born at Uttoxeter in Staffordshire, the 21st of December 1542. He was admitted scholar of Trinity-college, Oxford, the 4th of June 1561; and in 1567, took his degree of master of arts. In 1570, he quitted his college and fellowship, and retired to Gloucester-hall; where he studied very closely, and became famous for his knowledge in antiquity, philosophy, and mathematics. Having received an invitation from Henry earl of Northumberland, a great friend and patron of the mathematicians, he spent some time at the earl's house, where he became acquainted with those celebrated mathematicians Thomas Harriot, John Dee, Walter Warner, and Nathaniel Torporley. Robert earl of Leicester had a particular esteem for Mr Allen, and would have conferred a bishopric upon him, but his love of solitude and retirement made him decline the offer. His great skill in the mathematics, made the ignorant and vulgar look upon him as a magician or conjurer: the author of a book intitled *Leicester's Commonwealth*, has accordingly accused him with using the art of figuring, to procure the earl of Leicester's unlawful designs, and endeavouring by the black art to bring about a match betwixt him and Queen Elizabeth. But without pretending to point out the absurdity of the charge, it is certain that the earl placed such confidence in Allen, that nothing material in the state was transacted without his knowledge; and the earl had constant information, by letter, from Mr Allen, of what passed in the university. Mr Allen was very curious and indefatigable in collecting scattered manuscripts relating to history, antiquity, astronomy, philosophy, and mathematics: these collections have been quoted by several learned authors, &c. and mentioned to have been in the Bibliotheca Alleniana. He published in Latin the second and third books of Claudius

Allein
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Allen.

Alender
Alley.

dius Ptolemy of Pelusium, *Concerning the Judgment of the Stars*, or, as it is commonly called, of the *Quadripartite Constitution*, with an exposition. He wrote also notes on many of Lilly's books, and some on John Bale's work *De Scripturis Maj. Britannia*. Having lived to a great age, he died at Gloucester-hall, on the 30th of September 1632.

ALLENDORF, a small town in the circle of the Upper Rhine, and in the landgrate of Hesse-Cassel, remarkable for its salt-works, and three stone-bridges. It is seated on the river Wefer, 15 miles east of Cassel; E. Long. 10. 5. N. Lat. 51. 26.

ALLER, a river which runs thro' the duchy of Lunenburg, and falls into the Wefer, a little below Verden.

ALLERION, or ALERION, in heraldry, a sort of eagle without beak or feet, having nothing perfect but the wings. They differ from martlets by having their wings expanded, whereas those of the martlet are close; and denote imperialists vanquished and disarmed, for which reason they are more common in French than in German coats of arms.

ALLESTRY (Richard) D. D. an eminent divine, born at Uppington in Shropshire, in March 1619, was educated in the grammar school at Coventry, and afterwards at Christ-church in Oxford. His parts, which were extraordinary, were improved by a no less extraordinary industry. He took up arms for King Charles I. and was sometimes seen with his musket in one hand and his book in the other. He was very active in the service of King Charles II. before his restoration, and was employed by the royalists in transacting business with that prince during his exile; but was at last seized at Dover by a party of soldiers, and committed prisoner to Lambeth-house, where he was confined six or eight weeks: but soon after the restoration he was made canon of Christ-church, created doctor of divinity, and appointed chaplain in ordinary to the king, and regius professor of divinity. In 1665, he was appointed provost of Eton college, where he raised the school, which he found in a low condition, to an uncommon pitch of reputation. The west side of the outward quadrangle of that college was built from the ground at his expence. The excellent Dr Hammond, who was his intimate friend, left him his valuable library, which he himself afterwards bequeathed to his successors in the divinity-chair. He was eminent for his piety, benevolence, and integrity; for the sincerity of his friendships, and his disinterested temper. He wrote several books; and a collection of his sermons were printed after his decease, by Dr Fell, bishop of Oxford. He died August 28th 1680.

ALLEVEURE, a small brass Swedish coin, worth about $\frac{1}{4}$ d. English money.

ALLEY (William), bishop of Exeter in the reign of Queen Elizabeth, was born at Great Wymond in Buckinghamshire. From Eton school, in the year 1528, he removed to king's college, Cambridge, where he took the degree of bachelor of arts. He also studied some time at Oxford; afterwards he married, was presented to a living, and became a zealous reformer. Upon Queen Mary's accession, he left his cure, and retired into the north of England; where he maintained his wife and himself by teaching a school, and practising physic. Queen Elizabeth ascending the throne, he went to London, where he acquired great reputa-

tion by reading the divinity-lecture at St Paul's, and in July 1560. was consecrated bishop of Exeter. He was created doctor of divinity at Oxford in Nov. 1561. He died on the 15th of April 1570; and was buried at Exeter, in the cathedral. He wrote, 1. *The poor man's library*, 2 vol. fol. Lond. 1571. These volumes contain twelve lectures on the first epistle of St Peter, read at St Paul's. 2. *A Hebrew grammar*. Whether it was ever published, is uncertain. He translated the Pentateuch, in the version of the Bible which was undertaken by queen Elizabeth's command.

ALLEY, in gardening, a straight parallel walk, bounded on both sides with trees, shrubs, &c. and usually covered with gravel or turf.

ALLEY, among builders, denotes a narrow passage leading from one place to another.

ALLEY, in perspective, that which, in order to have a greater appearance of length, is made wider at the entrance than at the termination.

ALLIA, a river of Italy, which running down a very steep channel from the mountains of Crutunium, mixes with the Tiber at 40 miles from Rome; famous for the great slaughter of the Romans by the Gauls, under Brennus: hence *Allien's* dies, an unlucky day, (Virgil, Ovid, Lucan.) Our ancestors, says Cicero, deemed the day of the fight of *Allia*, more fatal than that of taking the city.

ALLIANCE, in the civil and canon law, the relation contracted between two persons or two families by marriage.

ALLIANCE is also used for a treaty entered into by sovereign princes and states, for their mutual safety and defence.—In this sense, alliances may be distinguished into such as are offensive, whereby the contracting parties oblige themselves jointly to attack some other power; and into defensive ones, whereby they bind themselves to stand by and defend each other in case they are attacked by others.

ALLIANCE, in a figurative sense, is applied to any kind of union or connection; thus we say, there is an alliance between the church and state.

ALLIGATI, in Roman antiquity, the basest kind of slaves, who were usually kept fettered. The Romans had three degrees, or orders, of slaves or servants; the first employed in the management of their estates; the second in the menial or lower functions of the family; the third called *alligati*, abovementioned.

ALLIGATION, the name of a method of solving all questions that relate to the mixture of one ingredient with another. Though writers on arithmetic generally make alligation a branch of that science; yet, as it is plainly nothing more than an application of the common properties of numbers, in order to solve a few questions that occur in particular branches of business, we chuse rather to keep it distinct from the science of arithmetic.

Alligation is generally divided into *medial* or *alter-nate*.

ALLIGATION *Medial*, from the rates and quantities of the simples given, discovers the rate of the mixture.

Rule. As the total quantity of the simples,
To their price or value;
So any quantity of the mixture,
To the rate.

Examp. A grocer mixeth 30 lb. of currants, at
+ d.

Alley
Alligation.

Allegation. 4 d. per lb. with 10 lb. of other currants, at 6 d. per lb : What is the value of 1 lb. of the mixture. *Ans.*
4½ d.

lb.	d.	d.
30,	at 4 amounts to	120
10,	at 6 ————	60
<hr/>		
40		180

If 40 : 180 :: 1 : 4½

Note 1. When the quantity of each simple is the same, the rate of the mixture is readily found by adding the rates of the simples, and dividing their sum by the number of simples, thus.

Suppose a grocer mixes several forts of sugar, and of each an equal quantity, viz. at 50 s. at 54 s. and at 60 s. per Cwt, the rate of the mixture will be 54 s. 8 d. per Cwt; for

$$50 + 54 + 60 = 164, \text{ and } 3(164)54 \text{ 8}$$

Note 2. If it be required to increase or diminish the quantity of the mixture, say, As the sum of the given quantities of the simples, to the several quantities given; so the quantity of the mixture proposed, to the quantities of the simples sought.

Note 3. If it be required to know how much of each simple is in an assigned portion of the mixture, say, As the quantity of the mixture, to the several quantities of the simples given; so the quantity of the assigned portion, to the quantities of the simples sought. Thus,

Suppose a grocer mixes 10 lb. of raisins, with 30 lb. of almonds, and 40 lb of currants, and it be demanded, how many ounces of each fort are found in every pound or in every sixteen ounces of the mixture, say,

$$\begin{aligned} 80 : 10 &:: 16 : 2 \text{ raisins.} \\ 80 : 30 &:: 16 : 6 \text{ almonds.} \\ 80 : 40 &:: 16 : 8 \text{ currants.} \end{aligned}$$

Proof 16

Note 4. If the rates of two simples, with the total value and total quantity of the mixture, be given, the quantity of each simple may be found as follows, viz. Multiply the lesser rate into the total quantity, subtract the product from the total value, and the remainder will be equal to the product of the excess of the higher rate above the lower, multiplied into the quantity of the higher-priced simple; and consequently the said remainder, divided by the difference of the rates, will quote the said quantity. Thus,

Suppose a grocer has a mixture of 400 lb weight, that cost him 7 l. 10 s. consisting of raisins at 4 d. per lb. and almonds at 6 d. how many pounds of almonds were in the mixture?

lb.	Rates.
400	6 d.
	4
<hr/>	
1600	1600 d. 2 d.

2)200(100 lb. of almonds at 6 d. is
And 300 lb. of raisins at 4 d. is,

Total 400

L. s.
2 10
5 0
Proof 7 10

Allegation Alternate, being the converse of allegation medial, from the rates of the simples, and rate of the mixture given, finds the quantities of the simples.

Rules. I. Place the rate of the mixture on the left side of a brace, as the root; and on the right side of the brace set the rates of the several simples, under one another, as the branches. II. Link or alligate the branches, so as one greater and another less than the root may be linked or yoked together. III. Set the difference betwixt the root and the several branches, right against their respective yoke-fellows. These alternate differences are the quantities required. Note, 1. If any branch happen to have two or more yoke-fellows, the difference betwixt the root and these yoke-fellows must be placed right against the said branch, one after another, and added into one sum. 2. In some questions, the branches may be alligated more ways than one; and a question will always admit of so many answers, as there are different ways of linking the branches.

Alligation alternate admits of three varieties, viz. 1. The question may be unlimited, with respect both to the quantity of the simples, and that of the mixture. 2. The question may be limited to a certain quantity of one or more of the simples. 3. The question may be limited to a certain quantity of the mixture.

Variety I. When the question is unlimited, with respect both to the quantity of the simples, and that of the mixture, this is called *Alligation Simple*.

Examp. A grocer would mix sugars, at 5 d. 7 d. and 10 d. per lb. so as to sell the mixture or compound at 8 d. per lb : What quantity of each must he take?

$$8 \left\{ \begin{array}{l} 5 \\ 7 \\ 10 \end{array} \right. \begin{array}{l} 2 \\ 2 \\ 1 \end{array} \left| \begin{array}{l} 2 \\ 2 \\ 4 \end{array} \right.$$

Here the rate of the mixture 8 is placed on the left side of the brace, as the root; and on the right side of the same brace are set the rates of the several simples, viz. 5, 7, 10, under one another, as the branches; according to Rule I.

The branch 10 being greater than the root, is alligated or linked with 7 and 5, both these being less than the root; as directed in Rule II.

The difference between the root 8 and the branch 5, viz. 3, is set right against this branch's yoke-fellow 10. The difference between 8 and 7 is likewise set right against the yoke-fellow 10. And the difference betwixt 8 and 10, viz. 2, is set right against the two yoke-fellows 7 and 5; as prescribed by Rule III.

As the branch 10 has two differences on the right, viz. 3 and 1, they are added; and the answer to the question is, that 2 lb at 5 d. 2 lb at 7 d. and 4 lb at 10 d. will make the mixture required.

The truth and reason of the rules will appear by considering, that whatever is lost upon any one branch is gained upon its yoke-fellow. Thus, in the above example, by selling 4 lb of 10 d. sugar at 8 d. per lb there is 8 d. lost: but the like sum is gained upon its two yoke-fellows; for by selling two 2 lb of 5 d. sugar at 8 d. per lb there is 6 d. gained; and by selling 2 lb of 7 d. sugar at 8 d. there is 2 d. gained; and 6 d. and 2 d. make 8 d.

Hence it follows, that the rate of the mixture must always be mean or middle with respect to the rates of the

Alligation
Allium.

the simples; that is, it must be lefts than the greatest, and greater than the least; otherwise a solution would be impossible. And the price of the total quantity mixed, computed at the rate of the mixture, will always be equal to the sum of the prices of the several quantities cast up at the respective rates of the simples.

Variety II. When the question is limited to a certain quantity of one or more of the simples, this is called *Alligation Partial*.

If the quantity of one of the simples only be limited, alligate the branches, and take their differences, as if there had been no such limitation; and then work by the following proportion:

As the difference right against the rate of the simple whose quantity is given,

To the other differences respectively;

So the quantity given,

To the several quantities sought.

Examp. A distiller would, with 40 gallons of brandy at 12 s. *per* gallon, mix rum at 7 s. *per* gallon, and gin at 4 s. *per* gallon: How much of the rum and gin must he take, to sell the mixture at 8 s. *per* gallon?

Gal.

$$8 \left\{ \begin{array}{l} 12 \\ 7 \\ 4 \end{array} \right\} \begin{array}{l} 14s \\ 4 \\ 4 \end{array} \left| \begin{array}{l} 5 \\ 4 \\ 4 \end{array} \right\} \begin{array}{l} 40 \text{ of brandy.} \\ 32 \text{ of rum.} \\ 32 \text{ of gin.} \end{array} \quad \left. \vphantom{\begin{array}{l} 12 \\ 7 \\ 4 \end{array}} \right\} \text{Ans.}$$

The operation gives for answer, 5 gallons of brandy, 4 of rum, and 4 of gin. But the question limits the quantity of brandy to 40 gallons; therefore say,

$$\text{If } 5 : 4 :: 40 : 32$$

The quantity of gin, by the operation, being also 4, the proportion needs not be repeated.

Variety III. When the question is limited to a certain quantity of the mixture, this is called *Alligation Total*.

After linking the branches, and taking the differences, work by the proportion following:

As the sum of the differences,

To each particular difference;

So the given total of the mixture,

To the respective quantities required.

Examp. A vintner hath wine at 3 s. *per* gallon, and would mix it with water, so as to make a composition of 144 gallons, worth 2 s. 6 d. *per* gallon: How much wine, and how much water, must he take?

Gal.

$$\begin{array}{r} 30 \left\{ \begin{array}{l} 36 \\ 0 \end{array} \right\} \begin{array}{l} 30 \\ 6 \end{array} \left| \begin{array}{l} 120 \text{ of wine.} \\ 24 \text{ of water.} \end{array} \right\} \text{Ans.} \\ \hline 36 \quad 144 \text{ total.} \\ 120 \times 36 = 4320 \\ 24 \times 6 = 144 \\ \hline 4464 \end{array}$$

Proof 144/4320/30

As 36 : 30 :: 144 : 120

As 36 : 6 :: 144 : 24.

There being here only two simples, and the total of the mixture limited, the question admits but of one answer.

ALLIGATOR, in zoology, a synonyme of the lacerta crocodilus. See **LACERTA**.

ALLIOTH, a star in the tail of the greater bear, much used for finding the latitude at sea.

ALLIUM, (from *ἄλιν*, to avoid or shun, because many shun the smell of it), **GARLIC**; a genus of the mon.

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nogynia order belonging to the hexandria class of plants. Of this genus no fewer than 33 different species are enumerated by Linnaeus, among which he includes the cepa and porrum; but as these are so generally known by the names of *onions* and *leeks*, we have given the description of them under these words **CEPA** and **PORRUM**.

The roots of garlic are of the bulbous kind, of an irregularly roundish shape, with several fibres at the bottom; each root is composed of a number of lesser bulbs, called *cloves* of garlic, inclosed in one common membranous coat, and easily separable from one another. All the parts of this plant, but more especially the roots, have an acrimonious, and almost caustic taste, with a strong offensive smell, which last has induced those who preserved some of the species in gardens on account of their yellow flowers, to eradicate them.

Culture. All the species of Garlick are very hardy, and will thrive in almost any soil or situation. They are easily propagated either by the roots or seeds. If from the roots, they ought to be planted in autumn, that they may take good root in the ground before the spring, which is necessary to make them flower before the following summer. If they are propagated by seeds, they may be sown on a border of common earth, either in autumn, soon after the seeds are ripe, or in the spring following; and will require no farther care than to keep them clear from weeds. In the following autumn, they may be transplanted into the borders where they are to remain.

Medicinal Uses. This pungent root warms and stimulates the solids, and attenuates tenacious juices; for which it is well adapted, on account of its being very penetrating; inasmuch, that, when applied to the feet, its scent is soon discovered in the breath; and, when taken internally, its smell is communicated to the urine, or the matter of an issue, and perspires through the pores of the skin. Hence, in cold leucophlegmatic habits, it proves a powerful expectorant, diuretic, and emmenagogue; and, if the patient is kept warm, sudorific. It is also of great service in humoral asthma and catarrhus disorders of the breast, and in other disorders proceeding from a laxity of the solids, and cold sluggish indispotion of the fluids. It is also frequently of service in the dropsy; in the beginning of which it is particularly recommended by Sydenham, as a warm strengthening medicine. By him it is also recommended as a most powerful revellent; for which purpose he was led to make use of it in the confluent small-pox. His method was to cut the root in pieces, and apply it, tied in a linnen cloth, to the soles of the feet, about the eighth day of the disease, after the face began to swell; renewing it once a-day till the danger was over.—When made into an unguent with oils, and applied externally, garlic is said to resolve and disperse cold tumours, and has been by some greatly celebrated in cutaneous disorders.

The acrimonious qualities of this root, however, render it manifestly improper on many occasions.—Its liberal use is apt to occasion headaches, flatulencies, thirst, febrile heats, inflammatory distempers, and sometimes discharges of blood from the hemorrhoidal vessels. In hot bilious constitutions, where there is already a degree of irritation, where the juices are too thin and acrimonious, or the viscera unbound, it never fails to aggravate

K k vate

Allium.

Allix
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Aluminor.

vate the diftemper. See MATERIA MEDICA, n° 85.

ALLIX (Dr Peter), a learned French proteſtant divine, born at Alençon, in 1641. He became miniſter of the reformed church at Roſen, where he published many learned and curious pieces; the credit of which induced the reformed to call him to Charenton, about a league from Paris, being the principal church they had in France. On the revocation of the edict of Nantz, he retired to England; where he ſtudied the language with ſo much ſucceſs, as to publiſh a work, intitled *Reflections on the books in the Holy Scriptures, to eſtabliſh the truth of the Chriſtian Religion*, 2 vols; which he dedicated to James II. acknowledging his obligations to that prince, and his kind behaviour to the diſtreſſed refugees in general. He wrote ſeveral other treatiſes relating to eccleſiaſtical hiſtory; which rendered him as famous in England as in France, for his ingenious and ſolid defences of the reformed religion. He was complimented with the degree of D. D. and in 1690 was made treaſurer of the church of Salisbury. He died in 1717.

ALLOA, or ALLOWAY, a ſea-port town of Men-tieth, in Scotland, ſeated on the river Forth, five miles eaſt of Stirling; and remarkable for its fine caſtle, the feat of the earl of Mar, and for the coal-mines near it. W. Long. 3. 45. N. Lat. 56. 10.

ALLOBROGES, (Inſcriptions, Livy, Velleius, Florus); from *Allobrox*, (Horace): a people of Gallia Narbonenſis, ſituated between the rivers Iſara and Rhodanus, and the Lacus Lemanus; commended by Cicero for their fidelity, diſcommended by Horace on account of their fondneſs for novelty.

ALLOCATION denotes the admitting or allowing of an article of an account, eſpecially in the exchequer. Hence,

ALLOCATIONE *Pacienda*, is a writ directed to the lord treaſurer, or barons of the exchequer, commanding them to allow an accountant ſuch ſums as he has lawfully expended in the execution of his office.

ALLODIUM, or ALLEUD, denotes lands which are the abſolute property of their owner, without being obliged to pay any ſervice or acknowledgment whatever to a ſuperior lord.

ALLOY, or ALLAY, properly ſignifies a proportion of a baſer metal mixed with a finer one. The alloy of gold is eſtimated by carats, that of ſilver by penny-weights. See GOLD, &c. In different nations, different proportions of alloy are uſed; whence their moneys are ſaid to be of different degrees of fineneſs or baſeneſs, and are valued accordingly in foreign exchanges.

In a more general ſenſe, the word is employed in chemistry to ſignify the union of different metallic matters.—As an infinity of different combinations may be made according to the nature, the number, and the proportions of the metallic matters capable of being alloyed, we ſhall not here enter into the detail of the particular alloys, all which are not yet nearly known. Thoſe which are uſed, are *Bronze, Tombac, Braſs, White Copper*, &c. may be found under their particular names; and what is known concerning other alloys may be found under the names of the different metals and ſemi-metals.

ALUMINOR, a perſon who colours or paints upon paper or parchment.—The word is derived from

the French *allumer*, to lighten.

ALLUSION, in rhetoric, a figure by which ſomething is applied to, or underſtood of, another, on account ſome ſimilitude between them.

ALLUVION, in law, denotes the gradual increaſe of land along the ſea-ſhore, or on banks of rivers *. See Law, Part III.

ALLY, in matters of polity, a ſovereign prince or ſtate that has entered into alliance with others †. No clxx. 6.

ALMACANTARS. See ALMUCANTARS.

ALMACARRON, a ſea-port town of Spain, in the province of Murcia, at the mouth of the river Guadalatin. It is about twenty miles weſt of Carthagena, and is remarkable for the prodigious quantity of alum found in its territory. W. Long. 1. 15. N. Lat. 37. 40.

ALMADE, a town of Spain, in the province of La Mancha, in the kingdom of Caſtile, ſituated upon the top of a mountain, where are the moſt ancient as well as the richeſt ſilver mines in Europe.

ALMADIE, a kind of canoe, or ſmall veſſel, about four fathoms long, commonly made of bark, and uſed by the negroes of Africa.

ALMADIE is alſo the name of a kind of long-boats, fitted out at Calicut, which are eighty feet in length, and fix or ſeven in breadth. They are exceedingly ſwift, and are otherwiſe called *cathuri*.

ALMAGEſT, in matters of literature, is particularly uſed for a collection or book compiled by Ptolemy, containing various problems of the ancients both in geometry and aſtronomy.

ALMAGEſT is alſo the title of other collections of this kind. Thus, Riccioli has publiſhed a book of aſtronomy, which he calls the *New Almageſt*; and Plukenet, a book which he calls *Almageſtrum Botanicum*.

ALMAGRA, a fine deep red ochre, with ſome admixture of purple, very heavy, and of a denſe yet friable ſtructure, and rough duſty ſurface. It adheres very firmly to the tongue, melts freely and eaſily in the mouth, is of an auſtere and ſtrongly aſtringent taſte, and ſtains the ſkin in touching. It is the *Sil Atticum* of the ancients; it ferments very violently with acid menſtrums, by which ſingle quality, it is ſufficiently diſtinguiſhed from the *Sil Syricum*, to which it has in many reſpects a great affinity. It is found in immense quantities, in many parts of Spain; and in Andaluſia there are in a manner whole mountains of it. It is uſed in painting, and in medicine as an aſtringent.

ALMAGRO, a ſtate of Spain, the capital of one of the diſtriſts of La Mancha. It was built by the archbiſhop Roderic of Toledo, who finiſhed it in 1214, and put a conſiderable gariſon into it to reſtrain the incuſions of the Moors. This was hardly done, when the ſtate was beſieged by an army of 5000 horſe and foot, under the command of a Moorish officer of great reputation; but the prelate, its founder, took care to ſupply thoſe within with ſuch plenty of neceſſaries, that at length the enemy found themſelves obliged to raiſe the ſiege and retire with great loſs.

ALMANACK, a book, or table, containing a calendar of days and months, the riſing and ſetting of the ſun, the age of the moon, the eclipſes of both luminaries, &c.—Authors are divided with regard to the etymology of the word; ſome deriving it from the Arabic particle *al*, and *manack*, to count; ſome from *al-manab*, new-years gifts, becauſe the Arabian aſtrologers uſed at the beginning of the year to make preſents

Alluſion
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Almanack.

See Law,
Part III.

No clxx. 6.

† See Al-
liance.

Almanack.

of their ephemerides; and others, from the Teutonic *almaen-achte*, observations on all the months. Mr Johnson derives it from the Arabic particle *al*, and the Greek $\mu\omega\nu$, a month. But the most simple etymology appears from the common spelling; the word being composed of two Arabic ones, *Al* *Manack*, which signify *the Diary*. All the classes of Arabs are commonly much given to the study of astronomy and astrology; to both which a pastoral life, and a sort of husbandry, not only incline them, but give them time and leisure to apply themselves to them. They neither sow, reap, plant, travel, buy or sell, or undertake any expedition or matter, without previously consulting the stars, or, in other words, their almanacks, or some of the makers of them. From these people, by their vicinity to Europe, this art, no less useful in one sense than stupid and ridiculous in another, hath passed over hither: and those astronomical compositions have still every where not only retained their old Arabic name; but were, like theirs, for a long while, and still are among many European nations, interperfed with a great number of astrological rules for planting, sowing, bleeding, purging, &c. down to the cutting of the hair and paring of the nails.—Regiomontanus appears to have been the first in Europe, however, who reduced almanacks into their present form and method, gave the characters of each year and month, foretold the eclipses and other phases, calculated the motions of the planets, &c. His first almanack was published in 1474.

Almanacks differ from one another, chiefly, in containing some more, others fewer, particulars.

The essential part is the calendar of months and days, with the risings and settings of the sun, age of the moon, &c. To these are added various *parerga*, astronomical, meteorological, chronological, political, rural, &c. as calculations and accounts of eclipses, solar ingresses, prognostics of the weather, tables of the tides, terms, &c. lists of posts, offices, dignities, public institutions, with many other articles political as well as local, and differing in different countries.—A great variety are annually published in Britain; some for binding, which may be denominated *book-almanacks*; others in loose papers, called *sheet-almanacks*.

The modern almanack answers to the *Fasti* of the ancient Romans. See *FASTI*.

Construction of ALMANACKS. The first thing to be done is, to compute the sun's and moon's place for each day of the year, or it may be taken from some ephemerides and entered into the almanack; next, find the dominical letter, and, by means thereof, distribute the calendar into weeks; then, having computed the time of easter, by it fix the other moveable feasts; adding the immovable ones, with the names of the martyrs, the rising and setting of each luminary, the length of day and night, the aspects of the planets, the phases of the moon, and the sun's entrance into the cardinal points of the ecliptic, *i. e.* the two equinoxes and solstices *. By the help of good astronomical tables or ephemerides, the construction of almanacks is extremely easy.

ALMANACK, among antiquaries, is also the name given to a kind of instrument, usually of wood, inscribed with various figures and Runic characters, and representing the order of the feasts, dominical letters, days of the week, and golden number, with other mat-

ters necessary to be known throughout the year; used by the ancient northern nations, in their computations of time, both civil and ecclesiastical. Almanacks of this kind are known by various names, among the different nations wherein they have been used; as rim-flocks, primaries, runflocks, runfaffs, *Scipiones Runici*, *Bacculi Annales*, clogs, &c. They appear to have been used only by the Swedes, Danes, and Norwegians. From the second of these people, their use was introduced into England, whence divers remains of them in the counties. Dr Plot has given the description and figure of one of these clogs, found in Staffordshire, under the title of *The perpetual Staffordshire Almanack*. The external figure and matter of these calendars appear to have been various. Sometimes they were cut on one or more wooden leaves, bound together after the manner of books; sometimes on the scabbards of swords, or even on daggers; sometimes on tools and implements, as portable steelyards, hammers, the helms of hatchets, flails, &c. Sometimes they were made of brass or horn; sometimes of the skins of eels, which, being drawn over a stick properly inscribed, retained the impressions of it. But the most usual form was that of walking-staves, or sticks, which they carried about with them to church, market, &c. Each of these staves is divided into three regions, whereof the first indicates the signs, the second the days of the week and year, and the third the golden number. The characters engraven on them are, in some, the ancient Runic; in others, the later Gothic characters of Uffius. The saints days are expressed in hieroglyphics, significative either of some endowment of the saint, the manner of his martyrdom, or the like. Thus, against the notch for the first of March, or St David's day, is represented a harp; against the 25th of October, or Crispin's day, a pair of shoes; against the 10th of August, or St Lawrence's day, a gridiron; and, lastly, against New-year's day, a horn, the mark of good drinking, which our ancestors gave a loose to at that season.

ALMANZA, a little town of New-Castile, on the frontiers of the kingdom of Valencia in Spain, situated in W. Long. 1. 19. N. Lat. 38. 54. It is remarkable for the defeat of the allies in 1707, under the Marquis de las Minas and the Earl of Galway. In the beginning of this action, the English troops penetrated thro' the centre of the Spanish army; but the Portuguese cavalry being broken by the Spanish, and the French infantry making a dreadful fire on their flanks, the allied army was at last broken, and began their retreat when it was almost dark. Colonel Hill carried off the remains of thirteen battalions towards the river Xucar, which, if they could have passed, they might have been safe; but being very much fatigued, they were obliged to halt; by which means they were surrounded, and forced to surrender prisoners of war. In this battle, the allies lost 120 standards, together with all their artillery and baggage; a great number were killed, and several thousands taken prisoners. The Marquis de las Minas was dangerously wounded; and his mistress, in the garb of an amazon, killed by his side. The earl of Galway had two cuts cross the face, which, though not dangerous, had prevented him from seeing, or giving orders properly.

HERESY OF ALMARIC, a tenet broached in
K k 2 France

Almanack,
Almaric.

* See
ASTRO-
NOMY, pag.
fin.

Almedia
||
Almeria.

France by one Almaric, in the year 1209. It consisted in affirming, that every Christian was actually a member of Christ; and that without this faith no one could be saved. His followers went farther, and affirmed, that the power of the Father lasted only during the continuance of the Mosaic law; that the coming of Christ introduced a new law; that at the end of this began the reign of the Holy Ghost; and that now confession and the sacraments were at an end, and that every one is to be saved by the internal operations of the Holy Spirit alone, without any external act of religion.

ALMEDIA, a frontier-town of Portugal, in the province of Tralos Montes, on the confines of Leon, where there was a very brisk action between the French and Portuguese in 1663; 17 miles N. W. of Ciudad Rodrigo. W. Long. 7. 10. N. Lat. 40. 41.

ALMEHRAB, in the Mahometan customs, a nich in their mosques, pointing towards the kebla or temple of Mecca, to which they are obliged to bow in praying. See **KEBLA**.

ALMENE, in commerce, a weight of two pounds used to weigh saffron in several parts of the continent of the E. Indies.

ALMERIA, a sea-port town in the kingdom of Granada in Spain, pleasantly situated in a fine bay at the mouth of the river Almeria, on the Mediterranean: W. Long. 3. 20. N. Lat. 36. 51. This town is by some thought to have risen upon the ruins of the ancient Abdera, and was formerly a place of great consequence. It was taken from the Moors in 1147, by the emperor Conrad III. in conjunction with the French, Genoese, and Pisans.—It was at that time the strongest place in Spain, held by the infidels; from which their privateers, which were exceedingly numerous, not only troubled the sea-coasts inhabited by the Christians, but gave equal disturbance to the maritime provinces of France, Italy, and the adjacent islands. The city being well fortified, having a strong castle, a numerous garrison, and being excellently provided with every thing necessary, made a vigorous resistance; but was at last taken by storm, when the victor put to the sword all the inhabitants who were found in arms, distributing the best part of the plunder among his allies, whom he sent away thoroughly satisfied. The Genoese, particularly, acquired here that emerald vessel which still remains in their treasury, and is deemed invaluable.

Upon its reduction by the Christians, Almeria became a bishopric; but is, at present, very little better than a village, indifferently inhabited, and has nothing to testify so much as the probability of its former greatness, except certain circumstances which cannot be effaced even by the indolence of the Spaniards themselves. What these are, Udal ap Rhys, a Welshman, thus describes, in his tour through Spain and Portugal. "Its climate," says he, "is so peculiarly blessed, that one really wants words to express its charms and excellence. Its fields and meads are covered with flowers all the year round; they are adorned also with palms, myrtles, plane-trees, oranges, and olives; and the mountains and promontories near it are as noted for their producing a great variety of precious stones, inasmuch that the next promontory to it is called the *Cape of Gater*, which is a corruption from the word *agates*, the

hills thereabouts abounding in that sort of precious stones, as well as in emeralds and amethysts, granites or coaric rubies, and extreme curious alabaster in the mountains of Filaires."

ALMIGIM-wood, (Scripture), is thought to be that of the Indian pine-tree; which being light and white, was greatly esteemed for making musical instruments.

ALMISSA, a small but strong town at the mouth of the Cetina, in Dalmatia, famous for its piracies; ten miles East of Spalatro. E. Long. 39. 33. N. Lat. 43. 56.

ALMOND, the fruit of the almond-tree *.

ALMOND, in commerce, a measure by which the Portuguese sell their oil; 26 almonds make a pipe.

ALMONDS, in anatomy, a name sometimes given to two glands, generally called the *tonsils*.

ALMOND-Furnace, among refiners, that in which the slags of litharge, left in refining silver, are reduced to lead again, by the help of charcoal.

ALMONDS, among lapidaries, signify pieces of rock-crystal, used in adorning branch-candlesticks, &c. on account of the resemblance they bear to the fruit of that name.

ALMONDBURY, a village in England, in the well-riding of Yorkshire, six miles from Halifax.

ALMONER, in its primitive sense, denotes an officer in religious houses, to whom belonged the management and distribution of the alms of the house. By the ancient canons, all monasteries were to spend at least a tenth part of their income in alms to the poor. The almoner of St Paul's is to dispose of the monies left for charity, according to the appointment of the donors, to bury the poor who die in the neighbourhood, and to breed up eight boys to singing, for the use of the choir. By an ancient canon, all bishops are required to keep almoners.

Lord ALMONER, or Lord High ALMONER, of England, is an ecclesiastical officer, generally a bishop, who has the forfeiture of all deadlands, and the goods of *felos de se*, which he is to distribute among the poor. He has also, by virtue of an ancient custom, the power of giving the first dish from the king's table to whatever poor person he pleases, or, instead of it, an alms in money.

Great ALMONER, Grand ALMONIER, in France, is the highest dignity in that kingdom. To him belongs the superintendency of all hospitals and houses of lepers. The king receives the sacrament from his hand; and he lays hands before the king, in all grand ceremonies and solemnities.

ALMONRY, AUMERY, AMERY. See **AMERY**.

ALMS, a general term for what is given out of charity to the poor.

In the early ages of Christianity, the alms of the charitable were divided into four parts; one of which was allotted to the bishop, another to the priests, and a third to the deacons and sub-deacons, which made their whole subsistence; the fourth part was employed in relieving the poor, and in repairing the churches.

No religious system is more frequent or warm in its exhortations to alms-giving, than the Mahometan. The Alcoran represents alms as a necessary means to make prayer be heard. Hence that saying of one of their kalifs: "Prayer carries us half-way to God, fasting brings

Almigim
||
Alms.

* See *Amygdalus*.

Alms
||
Alms.

brings us to the door of his palace, and alms introduces us into the presence-chamber." Hence many illustrious examples of this virtue among the Mahometans. Hafan, the son of Ali, and grandson of Mohammed, in particular, is related to have thrice in his life divided his substance equally between himself and the poor, and twice to have given away all he had. And the generality are so addicted to the doing of good, that they extend their charity even to brutes.

ALMS, also denotes lands or other effects left to churches or religious houses, on condition of praying for the soul of the donor. Hence,

Free ALMS was that which is liable to no rent or service.

Reasonable ALMS was a certain portion of the estates of intestate persons, allotted to the poor.

ALMS Box, or *Chest*, a small chest, or coffer, called by the Greeks *Kibatio*, wherein anciently the alms were collected, both at church and at private houses.

The alms-chest, in English churches, is a strong box, with a hole in the upper part, having three keys, one to be kept by the parson or curate, the other two by the church-wardens. The erecting of such alms-chest in every church is enjoined by the book of canons; as also the manner of distributing what is thus collected among the poor of the parish.

ALMS-House, a petty kind of hospital, for the maintenance of a certain number of poor, aged, or disabled people.

ALMUCANTARS, in astronomy, an Arabic word denoting circles of the sphere passing through the center of the sun, or a star, parallel to the horizon, being the same as PARALLELS of Altitude.

ALMUCANTARS-Staff, is an instrument usually made of pear-tree or box, having an arch of fifteen degrees; used to take observations of the sun, about the time of its rising and setting; in order to find the amplitude, and consequently the variation of the compass.

ALMUCIUM, denotes a kind of cover for the head, worn chiefly by monks and ecclesiastics: It was of a square form, and seems to have given rise to the bonnets of the same shape still retained in universities and cathedrals.

ALMUC-TREE, mentioned in Scripture, is supposed to be the same with that which produces the gum arabic.

ALMUNECAR, a sea-port town in the kingdom of Granada, seated on the Mediterranean, with a good harbour, defended by a strong castle, twenty miles south of Alhama. W. Long. 3. 45. N. Lat. 36. 50.

ALNAGE, or AULNAGE, the measuring of woollen manufactures with an ell. It was at first intended as a proof of the goodness of that commodity, and accordingly a seal was invented as a mark that the commodity was made according to the statute; but, it being now possible to purchase these seals, they are affixed, whenever the vender pleases, to all cloaths indiscriminately, to the great prejudice of our woollen manufactures.

ALNAGER, a public officer, whose duty it is to examine into the assize of all woollen cloth, six seals upon the various pieces, and collect the alnage-duty for the king.

ALNUS; a species of the alder tree. See BETULA.

ALNUS, in the ancient theatres, that part which was

most distant from the stage.

ALNWICK, a thoroughfare town in Northumberland, on the road to Scotland. Here Malcom, king of Scotland, making an inroad into Northumberland, was killed, with Edward his son, and his army defeated by Robert Mowbray, earl of this county, *anno* 1092. Likewife William, king of Scotland, in 1174, invading England with an army of 80,000 men, was here encountered, his army routed, and himself made prisoner. The town is populous, and in general well built; it has a large town-house, where the quarter-sessions and county-courts are held, and members of parliament elected. It has a spacious square, in which a market is held every Saturday. Alnwick appears to have been formerly fortified, by the vestiges of a wall still visible in many parts, and three gates which remain almost entire. It is governed by four chamberlains, who are chosen once in two years out of a common council, consisting of 24 members. It is ornamented by a stately old Gothic castle, which has been the seat of the noble family of Percy, earls of Northumberland. As the audits for receipt of rents have ever been in this castle, it has always been kept in tolerable repair; and not many years ago, it was repaired and beautified by the earl of Northumberland, who made very considerable alterations, upon a most elegant plan, with a view to reside in it some part of the summer-season. The manner of making freemen is peculiar to this place, and indeed is as ridiculous as singular. The persons who are to be made free, or, as the phrase is, leap the wall, assemble in the market-place, very early in the morning, on the 25th of April, being St Mark's day. They appear on horse-back, with every man his sword by his side, dressed in white, and with white night-caps, attended by the four chamberlains and the castle-bailiff, mounted and armed in the same manner; from hence they proceed, with music playing before them, to a large dirty pool, called *Free-man's-well*, where they dismount, and draw up in a body, at some distance from the water; and then rush into it all at once, and scramble through the mud as fast as they can. As the water is generally very foul, they come out in a dirty condition; but taking a dram, they put on dry cloaths, remount their horses, and ride full gallop round the confines of the district; then re-enter the town, sword in hand, and are met by women dressed in ribbons with bells and garlands, dancing and singing. These are called *timber-waifs*. The houses of the new freemen are on this day distinguished by a great lolly-bush, as a signal for their friends to assemble and make merry with them after their return. This ceremony is owing to King John, who was mired in this well; and who, as a punishment for not mending the road, made this a part of their charter. Alnwick is 310 miles north by west from London, 33 north of Newcastle, and 29 south of Berwick. Long. 1. 10. Lat. 55. 24.

ALOA, in Grecian antiquity, a festival kept in honour of Ceres by the husbandmen, and supposed to resemble our harvest-home.

ALOE, in botany, a genus of the monogynia order, belonging to the hexandria class of plants. Of this genus, botanical writers enumerate 23

Species. 1. The mitriformis, or mitre-shaped aloe. The leaves of this closely embrace the stalks; they are

Alnwick
||
Aloe.

Aloe.

Aloe.

are thick, succulent, broad at their base, growing narrower, and ending in a point; they draw together towards the top, where they somewhat resemble a nitre, from whence the species takes its name. The flower-stem rises about three feet high; on the top of which the flowers come out in a sort of globular spike, which afterwards becomes cylindrical. They have long footstalks, which come out horizontally, so that the flowers hang downward. They are tubulous, and cut into six unequal segments to the bottom, three being alternately broader than the others. The tube of the flower is of a fine red colour, and the brim of it a pale green, so that they make a fine appearance when the spikes of flowers are large. 2. The *barbadensis*, common, or Barbadoes aloë. The leaves of this sort are about four inches broad at their base, where they are near two inches thick, and diminish gradually to a point, having a few indentures on their edges, and when young are spotted with white. The flower-stem rises near three feet high. The flowers stand in a slender loose spike with very short footstalks, hanging downwards. They are tubulous, cut into six parts, and of a bright yellow colour. 3. The *arborescens*, or sword-aloe. This grows to the height of 10 or 12 feet, with a strong naked stem, the leaves growing at the top, which closely embrace the stalk; they are about two inches broad at their base, growing narrower to a point, and are indented on their edges, each being armed with a strong crooked spine. The flowers grow in a pyramidal spike, of a bright red colour; and are in beauty in November and December. 4. The *africana*, or African aloë. This species resembles the former; but the leaves are broader, and have several spines on the back side towards the extremities, and the flowers grow in a looser spike. 5. The *disticha*, by some called the *soap-aloe*, by others *Carolina-aloe*. This seldom rises above two feet high. The leaves are very broad at the base, where they closely embrace the stalk, and gradually decrease to a point. The edges are set with sharp spines, and the under leaves spread open horizontally every way. These are of a dark green colour spotted with white, somewhat resembling the colour of soft soap, from whence the plant got the name of *soap-aloe*. The flowers grow in umbels on the tops of the stalks, are of a beautiful red colour, and appear in August and September. 6. The *obscura*, with very broad spotted leaves embracing the stalk, whose edges are set with spines, and flowers growing in an umbel. This very much resembles the former; only the leaves are broader, and of a lighter green. The edges and also the spines are of a copper colour, and the flowers grow in loose spikes. They appear in September. 7. The *plicatilis*, with sword-shaped smooth leaves, grows to the height of six or seven feet. It has a strong stem, towards the upper part of which are produced two, three, or four heads, composed of long, compressed, pliable leaves, placed two ways, lying over one another, with their edges the same way. The flowers are produced in short loose spikes of a red colour, and appear at different times of the year. 8. The *brevioribus*, with leaves embracing the stalks, which are prickly on every side. This is an humble plant, seldom rising more than a foot high. The leaves grow near the ground, are broad at the base, where they embrace the stalk, and gradually diminish

to a point. Their edges, and also their upper parts, are beset with pretty sharp spines. The flowers grow in loose spikes, the tubulous part being red, and the brim of a light green colour. 9. The *variegata*, or partridge-breast aloë, is a low plant, seldom rising above eight inches high. The leaves of this are triangular, and curiously veined and spotted, somewhat like the feathers of a partridge's breast. The flowers grow in very loose spikes, and are of a fine red colour tipped with green. 10. The *hedge-hog aloë* is a very low plant, never rising to have stalks. The leaves are beset on their edges and both surfaces, with soft spines, very closely; from whence its name. The flowers grow on a loose head; and are of a fine red colour below, but of a pale green above. 11. The *viscosa*, with funnel-shaped flowers, grows near a foot high, with triangular leaves of a dark green colour. The flowers grow thinly upon very slender footstalks, are of an herbaceous colour, and their upper part turns backward. 12. The *spiralis*, with oval crenated flowers, grows somewhat like the former; only the flowers grow upon taller stalks, which branch out and grow in very long close spikes. 13. The *linguiforme*, or tongue-aloe, has its leaves about six inches in length, and shaped like a tongue. The flowers grow in slender loose spikes, each hanging downward, of a red colour below, and green at the top. 14. The *margaritifera*, or large pearl aloë, is a very beautiful plant. It is smaller than most of the aloë kind. The leaves are short, very thick, sharp pointed, and turning down, with a large thick end, appear there triangular. The colour of the leaves is a fine green, striped in an elegant manner with white, and frequently tipped with red at the point. The flower-stalk, which rises in the midst of the leaves, is round, smooth, of a purple colour, and generally about eight inches high. When the plant has been properly cultivated, the flowers are striped with green and white; and sometimes they are entirely white. This aloë is singular in not having the bitter resinous juice with which the leaves of most others abound; when a leaf of this species is cut, what runs from it is watery, colourless, and perfectly insipid *. 15. The *vera*, or socotorine aloë, hath long, narrow, succulent large heads. The stalks grow three or four feet high; and have two, three, and sometimes four, of these heads branching out from it. The flowers grow in long spikes, each standing on a pretty long footstalk; they are of a bright red colour tipped with green, and generally appear in the winter season. 16. The *glauca*, with a short stalk, and flowers growing in a head. This resembles the eighth in some particulars; but the leaves are much broader, and spread wide on every side, whereas those of the eighth are ranged only two ways, and are narrow. The *brevioribus* also flowers but seldom, whereas the *glauca* flowers annually in the spring. 17. The *arachnoidea*, or cobweb-aloe, never rises from the ground, but the leaves spread flat on the surface. The flower-stalk rises about a foot high, is very slender, and hath three or four small herbaceous flowers standing at a distance from each other. These are tubulous, and, at the brim, cut into six parts which turn backward. 18. The *herbacea*, with oval leaves, is also a small plant growing near the ground. The leaves are almost cylindrical

* Plate X.
62.

Aloe.

dricul toward their base, but angular near their ends, and are set with short soft spines at the angles. These leaves are shorter, and of a darker green colour, than those of the former sort. 19. The retufa, or cushion-aloe, hath very short, thick, succulent leaves, compressed on the upper side like a cushion. This grows very close to the ground; the flowers grow on slender stalks, and are of an herbaceous colour. 20. The verrucosa, or pearl-tongue-aloe, hath long, narrow, tongue-shaped leaves, which are hollowed on their upper side, but keel-shaped below. They are closely fludded on every side, with small white protuberances; from whence the plant hath had the name of *pearl-tongue-aloe*. The flowers grow on pretty tall stalks, and form loose spikes, each hanging downward. They are of a beautiful red colour, tipped with green. 21. The carinata, or low aloe, with fleshy, keel-shaped, spotted leaves. This hath some resemblance to the last, but the leaves are much broader and thicker; the flowers also are of a paler colour, and the spikes shorter. 22. The ferox, with dark green leaves, beset with spines on every side. This species grows to the height of eight or ten feet, with a strong stem. The leaves grow on the top, and closely embrace the stalk. They come out irregularly, and spread every way. They are near four inches broad at the base; and diminish gradually to the top, where they end in a spine. This sort hath not as yet flowered in Britain. 23. The uvaria, with reflexed flowers, lying over each other like tiles on a house. This species hath very long, narrow, triangular leaves, shaped like those of the bulrush. The flowers are produced in close thick spikes, upon stalks near three feet high. They are of an orange colour, having six yellow stamina, which come out beyond the tube of the flower; so that when the plants are strong, and produce large spikes, they make a fine appearance. The flowers appear in August and September. There is a variety of this species with narrower leaves, and longer spikes of flowers.

Culture. The proper earth for planting these vegetables in, is one half fresh light earth from a common, and the rest an equal mixture of white sea-sand and sifted lime-rubbish. This mixture should be always made six or eight months before the plants are to be set in it. The common aloe will live in a dry greenhouse in winter; and may be placed in the open air in summer, in a sheltered situation, but must have very little water. Most of the other aloes are best preserved in an airy glass-case, in which there is a stove, to make a little fire in very bad weather. The tenderest kinds require a greater share of heat to preserve them in winter, and should be kept in a good stove, in a degree of heat ten degrees above temperate. Many other kinds may also be kept in this heat; but the greater the heat, the more water they always require. About the beginning of June, it is usual in England to set the pots of aloes out of the house: but they should be set under the shelter of hedges, or trees, to keep them from the violence of the sun; the rains also, which usually fall in this and the following month, are apt to rot them. It is therefore best to keep them under cover the greatest part of the year. The best time to shift these plants is the middle of July. They are, on this occasion, to be taken out of the pots, the loose earth to be picked from

Aloe.

about their roots, and the decayed or mouldy parts of them cut off; then a few stones are to be put at the bottom of the pot, and it is to be filled with the composition before described, and the plants carefully put in, the roots being so disposed as not to interfere with one another. They are to be carefully watered after this, at times, for three weeks, and set in a shady place. The common kind will bear the open air from May to October, and should be shifted every year. All the aloes are propagated by off-sets, or by planting the leaves. The off-sets should be taken from the mother plant, at the time when it is shifted: they are to be planted in very small pots of the proper mixed earth; and if that part of them which joined to the mother-plant be observed to be moist when taken off, it should lie on the ground in a shady place two or three days before it is planted, otherwise it will rot. After planting these, they should remain in a shady place a fortnight; and then be removed to a very moderate hot-bed, plunging the pots therein, which will help their striking new roots. Towards the end of August they must be, by degrees, hardened to the open air, by taking off the glasses of the hot-bed; and in September they may be removed into the green-house.

ALOES, in medicine, the inspissated juice of some of the abovementioned species. The ancients distinguished two sorts of aloes: the one was pure and of a yellowish colour, inclining to red, resembling the colour of a liver, and thence named *hepatic*; the other was full of impurities, and hence supposed to be only the dross of the better kind. At present, various sorts are met with in the shops; which are distinguished either from the places, from the species of the plants, or from some differences in the juices themselves. These may be all ranged in three classes:

1. *Aloe Socotorina*, socotorine aloes, brought from the island Socotora in the Indian ocean, wrapt in skins; it is obtained from the 15th species abovementioned.—This sort is the purest of the three: it is of a glossy surface, clear, and in some degree pellucid; in the lump, of a yellowish red colour, with a purple cast; when reduced to powder, of a bright golden colour. It is hard and friable in the winter, somewhat pliable in summer, and grows soft betwixt the fingers. Its taste is bitter, accompanied with an aromatic flavour, but insufficient to prevent its being disagreeable: the smell is not very unpleasant, and somewhat resembles that of myrrh.

2. *Aloe Hepatica*, hepatic, Barbadoes, or common aloes, (the juice of the second species), is not so clear and bright as the foregoing sort; it is also of a darker colour, more compact texture, and for the most part drier. Its smell is much stronger and more disagreeable; the taste intensely bitter and nauseous, with little or nothing of the fine aromatic flavour of the Socotorine.—The best hepatic aloes come from Barbadoes in large gourd shells; an inferior sort of it (which is generally soft and clammy) is brought over in casks.

3. *Aloe Caballina*, fetid, caballine, or horse aloes, (the produce of an African aloe), is easily distinguished from both the foregoing, by its strong rank smell; although, in other respects, it agrees pretty much with the hepatic, and is not unfrequently sold in its stead. Sometimes the caballine aloes is prepared too pure and bright, as not to be distinguishable by the eye even from.

Aloes
|
Aloft.

from the Socotorine; but its offensive smell, which it cannot be devoid of, readily betrays it.

Aloes is a stimulating cathartic bitter: if given in too large a dose as to purge effectually, it often occasions an irritation about the anus, and sometimes a discharge of blood. Small doses of it frequently repeated, not only cleanse the *primæ viæ*, but likewise attenuate and dissolve viscid juices in the remoter parts, warm the habit, quicken the circulation, and promote the uterine and hæmorrhoidal fluxes. This medicine is particularly serviceable to persons of a phlegmatic temperament and sedentary life, and where the stomach is oppressed and weakened: in dry bilious habits, aloes prove injurious, immoderately heating the blood, and inflaming the bowels.

This juice is likewise, on account of its bitterness, supposed to kill worms, either taken internally, or applied in plasters to the umbilical region. It is also celebrated for restraining external hæmorrhages, and cleaning and healing wounds and ulcers.

Socotorine aloes contains more gummy matter than the hepatic; and hence it is likewise found to purge more, and with greater irritation. The first fort therefore is most proper where a stimulus is required, as for promoting or exciting the menstrual flux; whilst the latter is better calculated to act as a common purge.

ALOGIANS, in church-history, a sect of ancient heretics, who denied that Jesus Christ was the Logos, and consequently rejected the gospel of St John.

ALOGOTROPHIA, among physicians, a term signifying the unequal growth or nourishment of any part of the body, as in the rickets.

ALOOF, has frequently been mentioned as a sea-term; but whether jointly or not, we shall not presume to determine. It is known in common discourse to imply *at a distance*; and the resemblance of the phrases *keep a loof*, and *keep a luff*, or *keep the luff*, in all probability gave rise to this conjecture. If it was really a sea-phrase originally, it seems to have referred to the dangers of a lee-shore, in which situation the pilot might naturally apply it in the sense commonly understood, *viz.* keep *all off*, or quite off: it is, however, never expressed in that manner by seamen now*. It may not be improper to observe, that besides using this phrase in the same sense with us, the French also call the weather-side of a ship, and the weather-clue of a course, *le lof*.

ALOPECIA, in medicine, signifies a falling off of the hair, occasioned either by want of nourishment, or by a bad state of the humours. It is also used by Galen for a change in the colour of the hair.—See MEDICINE, n^o 853.

ALOPECURUS, or FOX-TAIL GRASS, in botany, a genus of the triandria digynia class. There are seven species, *viz.* the pratensis, or meadow fox-tail grass; the bulbosus, or bulbous fox-tail grass; the geniculatus, or flote fox-tail grass; and the myosuroides, or field fox-tail grass; these four grow wild in Britain: the agrestis, the montpeliensis, the panicus, and the hordeiformis, are all natives of France and the southern parts of Europe, except the last, which is a native of India*.

ALOSTA, a town in Flanders, belonging to the house of Austria, seated on the river Dender, in the midway between Brussels and Ghent. It has but one

parish; but the church is collegiate, and has a provost, a dean, and twelve canons. Here is a convent of Carmelites, another of capuchins, another of bare-footed Carmelites, three nunnies, an hospital, and a convent of Guillemins, in which is the tomb of Theodore Martin, who brought the art of printing out of Germany into the Low Countries. He was a friend of Erasmus, who wrote his epitaph. E. Long. 4. 10. N. Lat. 49. 55.

ALPHA, the name of the first letter of the Greek alphabet, answering to our A.—As a numeral, it stands for one, or the first of any thing. It is particularly used, among ancient writers, to denote the chief or first man of his class or rank. In this sense, the word stands contradistinguished from *beta*, which denotes the second person. Plato was called the *Alpha* of the wits: Eratosthenes, keeper of the Alexandrian library, whom some called a Second Plato, is frequently named *Beta*.

ALPHA is also used to denote the beginning of any thing. In which sense it stands opposed to *omega*, which denotes the end. And these two letters were made the symbol of Christianity; and accordingly were engraven on the tombs of the ancient Christians, to distinguish them from those of idolaters. Moralez, a Spanish writer, imagined that this custom only commenced since the rise of Arianism; and that it was peculiar to the orthodox, who hereby made confession of the eternity of Christ: but there are tombs prior to the age of Constantine whereon the two letters were found, besides that the emperor just mentioned bore them on his labarum before Arius appeared.

ALPHABET, the natural or customary series of the several letters of a language*. The word is formed from *alpha* and *beta*, the first and second letters of Greek alphabet. The number of letters is different in the alphabets of different languages. The English alphabet contains 24 letters; to which if we add *j* and *v* consonant, the sum will be 26: the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic 28; the Persian 31; the Turkish 33; the Georgian 36; the Coptic 32; the Muscovite 43; the Greek 24; the Latin 23; the Slavonic 27; the Dutch 26; the Spanish 27; the Italian 20; the Ethiopic and Tartarian, each 202; the Indians of Bengal 21; the Baramese 19. The Chinese have, properly speaking, no alphabet, except we call their whole language by that name; their letters are words, or rather hieroglyphics, amounting to about 80,000.

ALPHEUS, (Strabo); ALPHEIUS, (Ptolemy); a noted and large river of the Peloponnesus; which, rising in, and after several windings running through, Arcadia, and by Olympia in Elis, with a south-west course, pours into the Sinus Chelonites, about ten miles to the south of Olympia. It has a common spring with the Eurotas, at the foot of mount Parthenius, near the village Asca, (Strabo.) The Alpheus and Eurotas mix and run together for 20 stadia; after which, they enter a subterraneous passage at Mantinea; then again emerge, the Eurotas in Laconica, and the Alpheus in the territory of Megalopolis, (Pausanias.) The poets fable strange things of this river; particularly, that, out of love to the nymph *Arethusa*, it runs under the sea to Sicily, and bursts out at the fountain of that name in Syracuse, (Virgil.) Its waters were reckoned good in the leprosy, which is called *αλφει* by the Greeks; and hence

Alpha
|
Alpheus.

* See Luff.

* See the article Grass.

* See Læon-guage, and Writings.

Alphonfin
||
Alpini.

the name *Alpheus*.—Pausanias adds, that the Eleans had a law, which condemned any woman to death that should either appear at the Olympic games, or even cross this river during that solemnity: and the Eleans add, that the only woman who transgressed it, had disguised herself in the habit of a mafter or keeper of these games, and conducted her son thither; but when she saw him come off victorious, her joy made her forget her disguise, so that her sex was discovered. She was pardoned, but from that time a law was made that the keepers should appear there naked.

ALPHONSIN, in surgery, an instrument for extracting bullets out of gun-shot wounds. This instrument derives its name from the inventor Alphonfus Ferrer, a physician of Naples. It consists of three branches, which are closed by a ring. When closed and introduced into the wound, the operator draws back the ring towards the handle, upon which the branches opening take hold of the ball; and then the ring is pushed from the haft, by which means the branches grasp the ball so firmly, as to extract it from the wound.

ALPHONSUS X. king of Leon and Castile, furnished the Wife, was author of the astronomical tables called *Alphonfins*. Reading of Quintus Curtius gave him such delight, that it recovered him out of a dangerous illness. He read the Bible fourteen times, with several comments on it. He is said to have found fault with the structure of the mundane system, and has been charged with impiety on that score; but unjustly, for he only found fault with the involved system of some astronomers. He was dethroned by his son Sancho; and died of grief, A. D. 1284.

ALPINI (Prospero), a famous physician and botanist, born in the Venetian territory, in 1553. He travelled in Egypt to acquire a knowledge of exotic plants, and was the first who explained the fructification and generation of plants; by the sexual system. Upon his return to Venice, in 1586, Andrea Doria, prince of Melfi, appointed him his physician: and he distinguished himself so much in this capacity, that he was esteemed the first physician of his age. The republic of Venice began to be uneasy, that a subject of theirs, of so great merit as Alpini, should continue at Genoa, when he might be of so much service and honour to their state: they therefore recalled him in 1593, to fill the professorship of botany at Padua; and he had a salary of 200 florins, which was afterwards raised to 750. He discharged this office with great reputation; but his health became very precarious, having been much broke by the voyages he had made. According to the register of the university of Padua, he died the 5th of February 1617, in the 64th year of his age; and was buried the day after, without any funeral pomp, in the church of St Anthony.—Alpini wrote the following works in Latin: 1. Of the physic of the Egyptians, in four books. Printed at Venice, 1591, in 4^{to}. 2. A treatise concerning the plants of Egypt. Printed at Venice, 1592, in 4^{to}. 3. A dialogue concerning balsams. Printed at Venice, 1592, in 4^{to}. 4. Seven books concerning the method of forming a judgment of the life or death of patients. Printed at Venice, 1601, in 4^{to}. 5. Thirteen Books concerning methodical Physic. Padua, 1611, folio; Leyden, 1719, in 4^{to}. 6. A Disputation held in the school at Padua, concerning the Raphanticum. Padua, 1612,

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and 1629, 4^{to}. 7. Of exotic plants, in two books: Venice, 1609, in 4^{to}. He left several other works, which have never been printed; particularly, 8. The fifth book concerning the physic of the Egyptians. 9. Five books concerning the natural history of things observed in Egypt, adorned with a variety of draughts of plants, stones, and animals.

ALPINIA, in botany, a genus of the monogynia order, belonging to the monandria class of plants. Of this genus there is but one species, which is a native of the West Indies, where it grows naturally in moist places. The leaves decay every winter, and are pushed out from the roots in the spring, like the ginger and maranta; so must be managed in the same manner as directed for these two plants, and may be propagated by parting the roots when the leaves decay.

ALPS, a range of high mountains, separating Italy from Gaul and Germany, in the form of a crescent. They take their rise from the Vada Sabatia, or Savona; and reach to the Sinus Planaticus (now *Golfo di Carnaro* of the Adriatic), and the springs of the river Colapis (now the *Kulpe*); extending, according to Livy, 2000 stadia in length, or 250 miles: they are divided into several parts, and accordingly have different names. From Savona to the springs of the Varus, where the Alps lie against the sea of Genoa, they are called *Maritima*, now *le Montagne di Tenda*. These extend from south to north, between Gaul to the west, and Genoa to the east, beginning at Monaco on the Mediterranean; then running out thro' the east of the county of Nice, and between that and the marquise of Saluzzo, terminate at length at mount Viso, between Dauphine and Piedmont. Hence to Suva run the *Alpes Cottiae*, (Sueton.); *Cottane*, (Tacitus); mountains extremely high, separating Dauphine from Piedmont, and extending from mount Viso to mount Cenis, between the *Alpes Maritimae* to the south, and the *Graie* to the north. The *Alpes Graie*, (Pliny), so called from the passage of Hercules, begin from mount Cenis, where the *Cottiae* terminate; and run out between Savoy and the Tarentese to the west, and Piedmont and the Duché d'Aouste to the east, quite to the Great St Bernard, where the *Alpes Pennine* begin. They are also called by some *Graie Alpes*, and *Graius Mons*, (Tacitus); which extend from west to east, between St Bernard and the Adula, or St Godard; and thus they run out between the Vales to the north, and the Milanese to the south. With these are continued the *Alpes Rheticæ*, to the head of the river Piave; a part of which are the *Alpes Tridentinae*, to the north of Trent. To these join the *Alpes Noricæ*, reaching to Doblach in Tyrol, to the north of the river Tajamento: thence begin the *Alpes Carnicæ*, or of *Carniola*, extending to the springs of the Save; and the last, called *Alpes Panonicae*, and *Julia*, extend to the springs of the Kulpe. Some, however, extend the Alps to the north of Dalmatia; others again to Thrace and the Euxine. But their termination at the Kulpe, as above, is more generally received. They were formerly called *Albia*, and *Alpionia*, (Strabo.) Through these mountains Annibal forced his passage into Italy, by pouring vinegar on the rock, heated by burning large piles of wood on them, by which means they became crumbled; (Livy.) They are covered with perpetual snow.—*Alpes* or *Alper* is a celtic term for high mountains. Cluverius makes

L I

the

Alpuxarras the height of some 30, of others 50 miles; a height altogether incredible, even supposing we reckon from the level of the sea: the manner by which he found this height is nowhere said. According to the calculations of some geometricians, these mountains are somewhat less than two miles in perpendicular height.

ALPUXARRAS, or ALPAKARES, mountains of Spain, in the province of Granada, on the coast of the Mediterranean sea. They are about 17 leagues in length, and 11 in breadth, reaching from the city of Velez to Almeria. They are inhabited by Moors, who are the remains of the dispersion and ruin of their empire. They embraced the Christian religion; but preserve their own manner of living, and their language, though much corrupted. Here is a rivulet between Pitros and Portugos, which dyes linen that is dyed in it black in an instant. Near this rivulet is a cavern, from which proceeds so malignant a steam, that it destroys such animals as come near it. The Moriscos cultivate the soil extremely well, and plant-fruit trees; some of which grow to a prodigious height and thickness, and give the mountains a very agreeable aspect.

ALQUIER, a liquid measure, used in Portugal to measure oil, two of which make an almond *

ALQUIFOU, or ARQUIFOU, is a sort of lead-ore, which, when broken, looks like antimony. It is used by the potters to give a green varnish to their works, and thence is called potter's ore. It is met with in Cornwall, &c. The potters mix a small portion of manganese with the alquifou, and then the varnish or glazing on their ware is of a blackish hue.

ALREDUS, ALURED, or ALFREDUS, of Beverley, one of the most ancient and best English historians. He wrote in the reign of Henry I. There are no circumstances of his life known with any degree of certainty. It is generally believed that he was educated at Cambridge, and that he afterwards became one of the canons and treasurer of St John's at Beverley. And we learn in a note of bishop Tanner's, that, for the sake of improvement, he travelled thro' France and Italy; and that at Rome he became domestic chaplain to cardinal Othoboni. He died in the year 1128, or 1129; leaving behind him the following works: 1. *The Annals of Alured of Beverley*. Oxford, 1726. Published by Mr Hearne, from a manuscript belonging to Thomas Rawlinson, Esq. It contains an abridgement of our history from Brutus to Henry I. written in good Latin, and with great accuracy. 2. *Liberatus ecclesie S. Johannis de Beverlac*, &c. a manuscript in the Cotton Library. It is a collection of records relative to the church at Beverley, translated by our author from the Saxon language. The Biographia Britannica evidently proves these to be all that were written by Alredus.

ALRESFORD, a town of Hampshire, seated on the road from London to Southampton, close by the river Itchen, which feeds a great pond to the left of the town. Part of a Roman highway runs from hence to Alton. It is a rectory, with the mediety of Old Alresford, of 49*l*. 12*s*. 8*d*. in the king's books. It consists of about 200 houses; has one church; two principal streets, which are large and broad; and a small manufacture of linseys.

ALSA, a river of Carniola, (Pliny;) now the *Ausa*; running by Aquileia, with a short course from north to

south, into the Adriatic; where Constantine, the son of Constantine the Great, fighting against Constant his brother, lost his life.

ALSACE, a province of France, bounded on the east by the Rhine, on the south by Switzerland, on the west by Lorraine, and on the north by the palatinate of the Rhine. It was formerly a part of Germany, but was given to France by the treaty of Munster. It is one of the most fruitful and plentiful provinces of Europe, abounding in corn, wine, wood, flax, tobacco, pulse, fruits, &c. The mountains which divide it from Lorraine are very high; and generally covered with fir, beech, oak, and horn-beam. Those on the side of Switzerland are less high; and furnished with all sorts of wood, as well for fuel as building. The country itself is diversified with rising hills and fertile vales, besides large forests; but that between the rivers Ill, Hart, and the Rhine, as far as Straßburg, is inferior to the rest, on account of the frequent overflowing of the Rhine. In High Alsace, there are mines of silver, copper, and lead. They however work none but those of Giromany, from which are annually drawn 1600 marks of silver, each mark being eight ounces; and 24000 pounds of copper: but the expence of working them is almost equal to the profit. There are iron-works in several parts of Alsace, and particularly at Betford. There is a mineral spring at Sultzbach, near Munster, in High Alsace; which is in great reputation for the palsy, weakness of the nerves, and the gravel.—The original inhabitants of Alsace are honest and good-natured, but wedded to their own manners and customs. The fruitfulness of their country renders them indolent and inactive; for the Swiss make their hay and reap their corn, as well as manage the vintage of High Alsace, which sends a great deal of money out of the province. The common language is the German: however, the better sort of people speak French in the towns; and even in the country, they speak French well enough to be understood.

ALSEN, an island of Denmark in the lesser Belt, or entrance into the Baltic sea, between Sleswick and Funen. It is remarkable for nothing except two castles, and producing large crops of aniseeds, a carminative much used in seasoning the food and mixing with the bread all over the Danish dominions. E. Long. 10. 12. N. Lat. 55. 12.

ALSFIELD, a town of Germany, in the landgrate of Hesse Cassel, ten miles north-west of Marburg, and thirty-five south of Hesse Cassel. It is an ancient town, and well-built; and the inhabitants were the first of this country who embraced the Reformation. E. Long. 9. 5. N. Lat. 50. 40.

ALSHASH, a very beautiful city in Bukharia, supposed to be the same with that which is now called *Tashkent*, the capital of the eastern part of Turkestan, possessed by the Kassats. It is situated on the river *Sihán*, now *Sir*, and had a well watered garden for every house; but was ruined by Jenghiz Khan, who took the city, and caused a great number of its inhabitants to be massacred.

ALSHEDA, a parish of Sweden, in the province of Smaland, where a gold mine was discovered in 1738.

ALSINA, in botany, a synonyme of the theligonum. See THELIGONUM.

ALSINASTRUM, in botany, the trivial name and also

Alpuxarras
||
Alfa.

Alface
||
Alfinastrum

* See Almond.



Fig. 1.

ALOE floribus sessilibus bilabiatis
or PEARL ALOE



Fig. 2.

ALTAR of

Burnt Offering

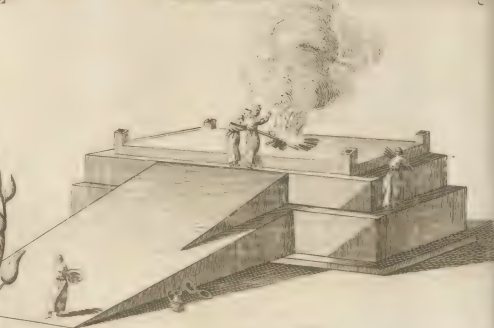
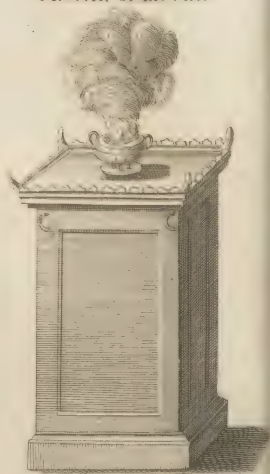


Fig. 3.

ALTAR of Incense



Alfæ also a synonyme of the elatine. See ELATINE.

ALSINE, CHICKWEED; a genus of the trigynia order, belonging to the pentandria class of plants. Of this genus a great number of species are enumerated by some botanical writers; but none of them possess any remarkable properties, except the media, or common chickweed, with white blossoms, which is so well known as to need no particular description.—This species affords a notable instance of what is called the *sleep of plants*: for, every night, the leaves approach in pairs, so as to include within their upper surfaces the tender rudiments of the new shoots; and the uppermost pair but one at the end of the stalk are furnished with longer leaf-stalks than the others; so that they can close upon the terminating pair, and protect the end of the branch. The young shoots and leaves, when boiled, can hardly be distinguished from spring spinach, and are equally wholesome.—Swine are extremely fond of chickweed; cows and horses eat it; sheep are indifferent to it; and goats refuse it.

ALSIRAT, in the Mahometan theology, denotes a bridge laid over the middle of hell, the passage or path whereof is sharper than the edge of a sword; over which every body must pass at the day of judgement, when the wicked will tumble headlong into hell, whereas the good will fly over it like the wind.

ALSIMUM, a city of ancient Etruria, occupying (according to Cluverius) the spot on which *Pala* now stands. We are told by Dionysius Halicarnassensis, that Alium was built by the Aborigines, long before the Tyrrhenians invaded Italy. In this case it must have been founded not long after the dispersion in the days of Peleg. Its founder is said to have been one *Alafus*, *Alafus*, or *Alifa*; whom some conjecture to have been Alifali, or Elifali, the son of Javan, mentioned in Scripture.

ALSTEDIUS (John-Henry), a German Protestant divine, and one of the most indefatigable writers of the 17th century. He was some time professor of philosophy and divinity at Herborn in the county of Nassau: from thence he went into Transylvania, to be professor at Alba Julia; where he continued till his death, which happened in 1638, being then 50 years of age. His *Encyclopædia* has been much esteemed even by the Roman-catholics; it was printed at Lyons, and sold very well throughout all France. His *Theaurus Chronologicus* is by some esteemed one of his best works, and has gone through several editions. He also wrote *Triumphus Biblicus*, to show that the principles of all arts and sciences are to be found in the Scriptures; but he gained very few to his opinion. He was a Millennarian; and published, in 1627, a treatise *De mille annis*, in which he asserted that the reign of the saints on earth was to begin in 1694.

ALSTON-MORE, a town in Cumberland, seated on a hill, at the bottom of which runs the river Tyne, with a stone bridge over it. Near this place is plenty of lead ore. W. Long. 2.4. N. Lat. 54.45.

ALT, in music, a term applied to the high notes in the scale.

ALTAMONT, a very handsome town of Italy, in the kingdom of Naples, and in Calabria Citerior, 15 miles north-west of Bagniano. E. Long. 16.22. N. Lat. 39.40.

ALTAMURA, a town of Naples, in the territory

of Bari, with the title of a principality, seated on the foot of the Apennine mountains. E. Long. 16.54. N. Lat. 41.0.

ÆLTAR, a place upon which sacrifices were anciently offered to some deity.

The heathens at first made their altars only of turf; afterwards they were made of stone, of marble, of wood, and even of horn, as that of Apollo in Delos.

Altars differed in figure as well as in materials. Some were round, others square, and others oval. All of them were turned towards the east, and stood lower than the statues of the gods; and were generally adorned with sculpture, inscriptions, and the leaves and flowers of the particular tree consecrated to the deity. Thus, the altars of Jupiter were decked with oak, those of Apollo with laurel, those of Venus with myrtle, and those of Minerva with olive.

The height of altars also differed according to the different gods to whom they sacrificed. Those of the celestial gods were raised to a great height above the ground; those appointed for the terrestrial, were almost on a level with the surface of the earth. On the contrary, they dug a hole for the altars of the infernal gods.

Before temples were in use, altars were erected sometimes in groves, sometimes in the highways, and sometimes on the tops of mountains; and it was a custom to engrave upon them the name, ensign, or character, of the deity to whom they were consecrated.

In the great temples of ancient Rome, there were ordinarily three altars: The first was placed in the sanctuary, at the foot of the statue of the divinity, upon which incense was burnt and libations offered; the second was before the gate of the temple, and upon it they sacrificed the victims; and the third was a portable altar, upon which were placed the offering and the sacred vessels.

Besides these uses of altars, the ancients swore upon them, and swore by them, in making alliances, confirming treaties of peace, and other solemn occasions. Altars also served as places of refuge to all those who fled to them, whatever crime they had committed.

Among the Jews, altars in the patriarchal times were very rude. The altar which Jacob set up at Beth-el was nothing but a stone, which served him instead of a bolster; that of Gideon, a stone before his house; and the first which God commanded Moses to erect was probably of earth, or unpolished stones, without any iron; for if any use was made of that metal, the altar was declared impure.

The principal altars of the Jews were, The altar of incense; that of burnt-offering; and the altar, or table, for the shew-bread.

The altar of incense was a small table of shittim-wood, covered with plates of gold, of one cubit in length, another in width, and two in height. At the four corners, were four kinds of horns, and all round a little border or crown over it. This was the altar hidden by Jeremiah before the captivity; and upon it the officiating priest offered, every morning and evening, incense of a particular composition. See Plate X. fig. 3.

The altar of burnt-offerings was made of Shittim-wood, and carried upon the shoulders of the priests by flaves of the same wood overlaid with brass. In the

Altar
Altena.

time of Moses, this altar was five cubits square, and three high; but in Solomon's temple it was much larger, being twenty cubits square, and ten in height. It was covered with brass; and at each corner was a horn of spire, wrought out of the same wood with the altar to which the sacrifices were tied. Within the hollow was a grate of brass, on which the fire was made; through it fell the ashes, and were received in a pan below. At the four corners of the grate were four rings and four chains, which kept it up at the horns. This altar was placed in the open air, that the smoke of the burnt-offerings might not fully the inside of the tabernacle. See Plate X. fig. 2.

The altar, or table, for the *show-bread*, was likewise of shittim-wood, covered with plates of gold, having a little border round it, adorned with sculpture. It was two cubits long, one wide, and one and an half in height. Upon this table, which stood in the holy of holies, were put, every sabbath-day, twelve loaves, with salt and incense.

The Jewish altars, after their return from the captivity, and the building of the second temple, were in some respects different from those described above. That of burnt-offerings was a large pile, built of unhewn stone, thirty-two cubits square at the bottom, and twenty-four square at the top. The ascent was by a gentle rising, thirty-two cubits in length, and sixteen in breadth.

ALTAR, is also used among Christians for the communion-table.

ALTAR-THANE, or ALTARIST, in old law-books, an appellation given to the priest or parson of a parish, to whom the altarage belonged. See ALTARAGE.

ALTARAGE, in law, altars erected in virtue of donations, before the Reformation, within a parochial church, for the purpose of singeing of souls for deceased friends.

ALTARAGE likewise signifies the profits arising to the priest on account of the altar.

AL-TAYEF, a town of Hejaz, a district of Arabia Felix. It is situated about 60 miles east of Mecca, behind mount Gazwan, where the cold is more intense than in any other part of the district, but the air very wholesome. Its territory abounds in fountains, and produces excellent raisins. The town is surrounded with a wall, but is not very large.

ALTDORF, a large handsome town in Switzerland, and the chief of the canton of Uri. It is situated below the lake of the four cantons, in a plain, at the foot of a mountain, whose passages are difficult, and serve instead of fortifications. It has four churches and two convents; St Martin's church and that of the Holy Cross are the finest. The town-house and the arsenal are also worth seeing. E. long. 8. 30. N. lat. 46. 50.

ALTEA, a sea-port town of Valencia, in Spain. It was taken in 1705, in favour of the archduke Charles; but lost after the battle of Almanza. W. long. 0. 15. N. lat. 46. 34.

ALTEMBURG, a town of Transylvania, 17 miles S. W. of Wissemburg, and 35 S. of Claufenbourg. E. long. 23. 5. N. lat. 46. 25.

ALTENA, a sea-port town of Germany, in the duchy of Holstein, in Lower Saxony. It is a modern town, built by the king of Denmark, and was burnt by the Swedes in 1712; but has since been beautiful-

ly re-built. The merchandize brought from Asia, by the Danish East-India company, is sold here. E. long. 10. 0. N. lat. 53. 51.

ALTENBERG, an ancient town of Germany, situated on the river Pleiss, with a good castle placed on a rock, in Misnia, in the circle of the Upper Saxony. It was formerly an imperial city, but at present belongs to the house of Saxony. Here is a college which has always been in a flourishing condition. In 1705, there was a nunnery founded for women of a high rank, who are Protestants. E. Long. 15. 8. N. Lat. 50. 59.

ALTENBURG, a small fortified town of Hungary, in the territory of Moson, near the Danube, about 55 miles from Vienna. E. long. 35. 30. N. lat. 48. 15.

ALTENBURG, or OWAR, a small but strong town of Hungary, seated in a marsh, with wide streets. It is near the river Danube, and is surrounded with deep ditches. It is 15 miles south of Presburg, 40 south-east of Vienna, and 65 south-west of Buda. E. long. 17. 56. N. lat. 44. 0.

ALTERANTS, or ALTERNATIVE Medicines, such as correct the bad qualities of the blood and other humours, without occasioning any sensible evacuation *.

ALTERATION, in a general sense, denotes some variation in the qualities or circumstances of a thing, without wholly changing its nature.

ALTERATION, in music, the distance of any interval increased or diminished, which of consequence must sharpen or flatten the chords which these altered intervals compose.

ALTERN-BASE, in trigonometry, a term used in contradistinction to the true base. Thus in oblique triangles, the true base is either the sum of the sides, and then the difference of the sides is called the altern-base; or the true base is the difference of the sides, and then the sum of the sides is called the altern-base.

ALTERNATE, in a general sense, a term applied to such persons or things as succeed each other by turns. Thus, two who command each his day, are said to have an alternate command, or to command alternately.

ALTERNATE, in heraldry, is said in respect of the situation of the quarters. Thus the first and fourth quarters, and the second and third, are usually of the same nature, and are called alternate quarters.

ALTERNATE, in botany, when the leaves or branches of plants arise higher on opposite sides alternately.

ALTHÆA, MARSHMALLOW; a genus of the polyandria order, belonging to the monodelphia class of plants. There are three

Species. 1. The vulgaris, or common marshmallow, is a native of Britain, and hath a perennial root, and an annual stalk, which perishes every autumn. The stalks grow erect to the height of four or five feet. These are garnished with leaves which are hoary, soft to the touch, and placed alternately on the branches. The flowers come out from under the wings of the leaves, like the mallow, and are of a purplish white. 2. The hirsuta, or hairy marshmallow, is a native of Spain and Portugal. It is a low plant, whose branches trail on the ground, unless they are supported by stakes. The leaves and stalks are beset with strong hairs, the flowers come out like those of the common sort, but are smaller, and have purplish bottoms. 3. The cannabina, or shrubby

Altenburg
Althæa.

* See Med-
icines, n^o 373,
&c.

Althæa
|
Alting.

shrubby marshmallow, is a native of Hungary and Istria. It has a woody stem, which rises to the height of four or five feet; and puts out many side-branches. The flowers come out in the same manner as in the others, but are of a deeper red colour. This sort seldom flowers the first year, unless the summer proves warm; but, when the plants live thro' the winter, they will flower early in the following summer, and produce good seeds.

Culture. Though the first sort is found naturally in salt marshes, it will thrive when transplanted into any soil, or in any situation; however, it will always grow larger in moist than in dry soil. It may be propagated either by parting the roots in autumn when the stalks decay, or by sowing the seeds in the spring. If the seeds of the second species are sown in April, the plants will flower in July, and carry ripe seed in September. They ought to be sown in the places where they are to remain, as the roots shoot deep into the ground; so that, unless the plants are removed very young, they seldom survive it. The seeds of the cannabina ought also to be sown where the plants are to remain, for the reason just now given. They should have a sheltered situation and a dry soil, otherwise they will not live through the winter. Indeed they seldom continue in this country above two years, with all the care that can be taken of them.

Medicinal Uses. The first is the only species used in medicine. The whole plant, especially the root, abounds with a mild mucilage. It has the general virtues of an emollient medicine; and proves serviceable in a thin acrimonious state of the juices, and where the natural mucus of the intestines is abraded. It is chiefly recommended in sharp disfluxions upon the lungs, hoarseness, dysenteries; and likewise in nephritic and calculous complaints: not, as some have supposed, that this medicine has any peculiar power of dissolving or expelling the calculus; but as, by lubricating and relaxing the vessels, it procures a more free and easy passage. The root is sometimes employed externally for softening and maturing hard tumours; chewed, it is said to give ease in difficult dentition of children *.

ALTHÆA Frut. See HIBISCUS and LAVATERA.

ALTIMETRY, the art of measuring altitudes or heights, whether accessible or inaccessible *.

ALTIN, a lake in Siberia, from whence issues the river Ob, or Oby, in N. lat. 52. o. E. long. 85° 55'. This lake is called by the Russians *Teloiskoi Ozero*, from the Telleis, a Tartarian nation, who inhabit the borders of it, and who give it the name of *Altin-Kul*. By the Calmucks it is called *Altinnor*. It is near ninety miles long and 50 broad, with a rocky bottom. The north part of it is sometimes frozen so hard as to be passable on foot, but the southern part is never covered with ice. The water in the Altin lake, as well as in the rivers which run through the adjacent places, only rises in the middle of summer, when the snows on the mountains are melted by the heat of the sun.

ALTING (Henry), professor of divinity at Heidelberg and Groningen, born at Embden, Feb. 17. 1583, of a family which had been long conspicuous in Friseland. His father, Menso Alting, was the first, who, with two others, preached the reformation in the territory of Groningen, about the year 1566, under the tyrannical government of the duke of Alva; and the first that preached in the great church of Gronin-

Alting
|
Alton.

gen, after the reduction of that town by the States General in 1594. Henry was chosen, in 1605, preceptor to the three young counts of Nassau, Solms, and Izenberg. After various difficulties, he settled at Groningen, where he continued till his death, August 25. 1644. He was a sound protestant divine, a pious Christian, a useful member of society in many respects, and one who suffered much for the truth. Most of his works were never published; those which have been, are the following: *Nota in decadem problematum J. Behm*, 1618. *Loci communes explicatio catechesos Palatina*, 1646, in 3 vols. *Exege sis Augustana confes.* 1647. *Methodus theologiae*, 1650. It appears from the catalogue of his works annexed to his life, that the *Medulla bist. prophana*, published by D. Pareus, was composed by Alting. The most remarkable piece among Alting's MSS. is The ecclesiastical history of the Palatinate, from the reformation to the administration of John Casimir.

ALTING (James), son of the former, was born at Heidelberg, September 27. 1618. He travelled into England in 1640, where he was ordained by the learned Dr Prideaux, bishop of Worcester. He afterwards accepted of the professorship of Groningen, vacant by the death of Gomarus; but his situation was rendered very disagreeable by the continual disputes which he had with his colleague Sam. des Marets, who favoured the school-divinity. He made a pious exit, August 20, 1679, recommending the edition of his works to Menso Alting (author of *Notitia German. Inscr. Antiquæ*, fol. Amst. 1697); but they were published in 5 vols folio, with his life, by Mr Bekker of Amsterdam. They contain various analytical, exegetical, practical, problematical, and philosophical tracts, which shew his great industry and knowledge. Alting was a divine greatly addicted to the text of the scripture, to Cocceianism, and Rabbiniim. He preached well in German, Dutch, and English.

ALTITUDE, accessible, and inaccessible. See GEOMETRY, Part II. chap. i.

The method of taking considerable terrestrial altitudes, of which those of mountains are the greatest, by means of the barometer, is very easy and expeditious. It is done by observing, on the top of the mountain, how much the mercury has fallen below what it was at the foot of the mountain. See BAROMETER.

ALTIRKIRK, a town of Altsace in Germany, situated on the river Ill, in N. lat. 47. 40. and E. lon. 7. 15.

ALTMORE, a town of Ireland, in the county of Tyrone, and province of Ulster, situated in N. lat. 54. 34. and W. long. 7. 2.

ALTON, a town in Hampshire, seated on the river Wey; W. long. o. 46. N. lat. 51. 5. It is governed by a constable; and consists of about 250 houses, indifferently built, chiefly laid out in one pretty broad street, a part of which only is paved. It has one church, a Presbyterian, and a Quaker's meeting, a famous free-school, a large manufacture of plain and figured baragons, ribbed druggets, and serge de Nîmes; and round the town is a large plantation of hops.

ALTON, or AVELTON, a village in Staffordshire, five miles north of Uttoxeter. There are the ruins of a castle here, which some would have to be built before the Norman conquest; but Dr Plot is pretty certain that it was erected by Theobald de Verdun, in the be-
ginning

* See *Mathe-
ria Medica*,
no 90.
† See *Alti-
tude*.

Alto-
relievo
||
Alutidium.

ginning of the reign of Edward II. A great part of the walls are still standing, but they are in a very ruinous condition.

ALTO-RELIEVO. See RELIEVO.

ALTO-RIPIENO, in music, the tenor of the great chorus which sings and plays only now and then in some particular places.

ALTORF, a town of the circle of Franconia, in Germany. It has a physic-garden, with 2000 different plants; a theatre for dissections, which has many curiosities in the anatomical way; and a handsome library. It is subject to the house of Brandenburg; and is seated on the confines of Bavaria, 15 miles from Nuremberg. E. lon. 9. 35. N. lat. 47. 46.

ALT-RANSTADT, a town in Saxony, famous for the treaty between Charles XII. king of Sweden, and Augustus elector of Saxony, in 1706, wherein the latter reigned the kingdom of Poland.

ALTRINGHAM, a town of Cheshire in England, upon the borders of Lancashire, seven miles from Manchester. W. long. 1. 30. N. lat. 53. 25.

ALTZEG, a town of Germany in the Lower Palatinate, the capital of a territory of the same name, with an old castle. W. long. 7. 25. N. lat. 49. 44.

ALVA DE TORMES, a considerable town in Spain, in the kingdom of Leon, and territory of Salamanca, with a very handsome castle. It is seated on the north bank of the river Tormes. W. long. 6. 1. N. lat. 41. 0.

ALVARISTS, in ecclesiastical history, a branch of the Thomists, so called from Alvares their leader, who asserted the doctrine of sufficient grace, instead of the efficacious grace of the ancient Thomists. The Alvarists came near to the Jesuits, the ancient Thomists to the Janfenists.

ALUDELS, in chemistry, are earthen pots without bottoms, inserted into each other, and used in sublimations. See CHEMISTRY, n° 80.

* See Apis. ALVEOLUS, in natural history, the name of the waxen cells in bee-hives*. Also the name of a sea-fossil of a conic figure, composed of a number of cells, like bee-hives, joined into each other, with a pipe of communication.

ALVEOLUS, in anatomy, the sockets in the jaws wherein the teeth are fixed†.—Some writers speak of teeth growing without alveoli. Pliny mentions a person who had a tooth in his palate. Eustachius relates, that he saw a man who at 60 had a tooth growing out of the middle of his fauces. Holler gives an instance of a person, whose teeth were of a piece with his jaws, without any insertion into alveoli.

ALUM, or ALUMEN, in natural history, a peculiar kind of salt, sometimes found pure, but oftener separated from several substances; as, a soft reddish stone in Italy; several kinds of earth; and, in England, from a whitish or bluish stone, called Irish slate*.—In medicine, it is a powerful astringent†. In dyeing, it fixes the colours upon the stuffs. See DYEING.

* See Chemistry, n° 129.
† See Materia Medica, n° 91.

ALUNTUM, ALUNTUM, (anc. geogr.) a town in the north of Sicily, situated on a steep eminence, at the mouth of the Chydus, (Ptolemy, Pliny, Cicero;) said to be as old as the war of Troy, (Dionys. Halicarn.) Now in ruins; from which arose the hamlet *St Filadelfo*, in the Val di Demona. The inhabitants were called *Haluntini*, (Cicero.)

ALVUS, in anatomy, a term used for the belly in general, but more frequently applied to the bowels.

ALWAIIDII, a sect of Mahometans who believe all great crimes to be unpardonable.—The Alwadii stand in opposition to the Morgii. They attribute less efficacy to the true belief in the salvation of men, than the rest of the Musselmans.

ALYSSUM, ALYSSON, or ALYSSOIDES, Madwort; (from *alvus*, to be mad; because it was believed to have the property of curing madnes): a genus of the filiculosa order, belonging to the tetradynamia class of plants.

Species. Of this genus, Linnaeus enumerates 19 species; but none of them are remarkable either for beauty, or any other property, except the halimifolium, or madwort with whole spear-shaped leaves. This spreads itself upon the ground, and never rises to any height. It produces, at the extremity of its branches, very pretty tufts of small white flowers; of which it is seldom destitute for six or seven months successively; for which reason it well deserves a place in the gardens of the curious.

Culture. Though these plants are natives of the southern parts of Europe; yet, if planted on a dry, lean, or rubbishy soil, they will endure our severest winters in the open air.—The halimifolium seldom continues above two or three years, and must therefore be often sown to preserve it; or if the seeds are suffered to fall, the plants will rise without any trouble. It may also be propagated by cuttings, which ought to be planted in April or May, and are very apt to take root, if kept shaded in the heat of the day, and gently refreshed with water.

This plant, as already observed, was thought to cure some kinds of madnes; but the present practice has entirely rejected it for this or any other purpose.

ALYTARCHA, a priest of Antioch in Syria, who, in the games instituted in honour of the gods, presided over the officers who carried rods to clear away the crowd and keep order.

In the Olympic games, the alytarches had the same command, and obliged every person to preserve order and decency.

ALZIRA, a town of Spain, in the kingdom of Valencia, seated on the river Xucar, E. Long. o. 20. N. Lat. 39. 10.

AMABYR, a barbarous custom which formerly prevailed in several parts of England and Wales, being a sum of money paid to the lord, when a maid was married within his lordship. The word is old British, and signifies "the price of virginity."

AMADABAT, a corruption from AHMED ABAD, or *Ahmed's city*, (so called from a king of that name); a large and populous city of Indostan, and the capital of the province of Guzzerat. It is situated in E. Long. 72. 12. N. Lat. 23. 0. Amadabat was formerly called *Guzzerat*; and by Shah Jehan nicknamed *Gherd-abad*, or the habitation of dust, because it was much incommoded therewith. It was the seat of the Guzzerat kings, as it is now of the Mogul governor. The city stands in a beautiful plain; and is watered by the little river Sabremetti which, though not deep, in time of rains overflows the plains prodigiously. The walls are built with stone and brick, flanked at certain distances with great round towers and battlements. It has

Alvus
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Amadabat.

Amadan
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Amad-
magda.

has twelve gates; and, including the suburbs, is about four miles and an half long. The streets are wide. The *meydan shah*, or king's square, is 700 paces long, and 400 broad, planted round with trees. On the west side is the castle, well walled with free stone, and as spacious as a little city; but its inward appearance is not conformable to its external magnificence. The caravanera is on the south of the square, and its chief ornament. Near the meidan also is the king's palace, whose apartments are richly ornamented: and in the midst of the city is the English factory, where they purchase fine chints, callicoes, and other Indian merchandize. The place is so full of gardens stored with fruit-trees, that from an eminence it looks like a wood. The Hindoos have here an hospital for sick beasts, and another for sick birds, which they take great care of. According to some late accounts, this city is little inferior to the best in Europe, and is thought to yield ten times as much revenue as Surat.

AMADAN, or HAMADAN, a town of Persia, between Tauris and Ispahan. E. Long. 47. 4. N. Lat. 35. 15. It is seated at the foot of a mountain, where there are a great many springs, which water the adjacent country. The extent of the city is very large; but there are a great many walled spots within it, as well as cultivated land. The houses are built of brick hardened in the sun, and have but a very indifferent aspect. There is but one tolerable street; and that is where stuffs, garments, and the like, are exposed to sale: it is straight, long, and wide; and the shops are very well furnished. The adjacent parts are fruitful in corn and rice, inasmuch that the neighbouring provinces are supplied from hence. It is said to enjoy a very salubrious air, but the cold in winter is intense. The Armenians have a church in this town, but it is a very ill-contrived structure. The Jews have a synagogue near a tomb where they pretend either the Mordecai lie interred. To this place they come in pilgrimage from several parts of the Levant. About a league from Amadan, there is a mountain called *Nalbana*, which abounds with all sorts of curious herbs. In the spring, people flock to this mountain from all parts to recover their health, by sucking in the salutary effluvia with their breath.

Amadan is a very ancient city. It is said to have been destroyed by Nebuchadnezzar, and rebuilt by Darius, who brought hither all his riches. The kings of Persia frequently retired to this place on account of its delightful situation; for which reason it obtained the name of the *Royal city*. It was conquered by the khalif Othman, and narrowly escaped being destroyed by Jenghis Khan in 1220. It had then strong walls and a good castle, which are now in ruins. Its present beauty consists in its gardens and springs.

AMADANAGER, a town in the hither peninsula of India, in the province of Decan. E. Long. 74. 15. N. Lat. 18. 10.—It was taken by the Moguls in 1598, after a siege of six months; being at that time defended by a strong castle, situated on an eminence, and surrounded with deep ditches, into which several springs discharged their waters.

AMADIA, a trading town of Asia, in Curdistan, belonging to the Turks; seated on a high mountain. E. Long. 43. 1. N. Lat. 36. 25.

AMADMAGDA, an Abyssinian plant, said to be used by the inhabitants of that country for facilitating

Amain
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Amalthes.

the consolidation of fractures, and the discharge of bony splinters from wounds.

AMAIN, in the sea-language, a term importing to lower something at once. Thus, to *strike amain*, is to lower, or let fall, the top-fails; to *wave amain* is to make a signal, by waving a drawn sword, or the like, as a demand that the enemy strike their top-fails.

AMAK, a small island in the Baltic sea, near Copenhagen, from which it is separated by a canal, over which there is a draw-bridge. There is a good citadel, which they call *Christian-Haven*. It is remarkable for a village of Dutch, who are descended from a colony that settled there to make butter and cheese for the court. They retain their own language, manner of dress, and other customs. E. Long. 12. 10. N. Lat. 55. 20.

AMAL, a town of Sweden, in the province of Daland, seated on the river Wefer. It has a good harbour; and carries on a great trade, especially in timber, deals, and tar. E. Long. 12. 40. N. Lat. 58. 50.

AMALEKITES, by some thought to be the descendants of Amalek the grandson of Esau; by others, with more probability, to have been a Canaanitish tribe. They were a wicked people, and therefore devoted to destruction. They lived to the east of the Lacus Asphalites; next the Moabites to the south, and the Ammonites to the north. A branch of them dwelt to the south of Canaan.

AMALFI, an ancient city of Italy, situated in E. Long. 15. 20. N. Lat. 40. 35.—It is generally supposed to have been founded about the year 600. It was at first subject to the dukedom of Naples, and was governed by annual prefects; but being afterwards erected into a duchy, it extended its territory, which reached eastward from Vico Vecchio, and westward to the promontory of Minerva, including likewise the island of Caprea, and the two islands of the Galli. Towards the north it comprehended the cities of Lettere, Gragnano, Pimontio, and Capule di Franchi; towards the south, those of Scala, Ravelli, Minori, Majuri, Atrani, Tramonti, Agerula, Citara, Prajano, and Rofilano.—The laws which this republic made with regard to trade and commerce, afterwards had the same authority in the kingdom of Naples as the Rhodian laws had among the Romans.—At present Amalfi is subject to Naples, and is the see of an archbishop. It is famous for giving birth to Flavius Blendus, inventor of the mariners compass.

AMALGAM, mercury united with some metal.

AMALGAMATION, the operation of making an amalgam, or mixing mercury with any metal.*

* See Chemistry, no 421.

AMALTHEA, the name of the Cuman Sibyl, who offered to Tarquinius Superbus nine books, containing the Roman destinies, and demanded 300 pieces of gold for them. He desired her, whereupon she threw three of them into the fire; and returning, asked the same price for the other six: which being denied, she burnt three more; and returned, still demanding the same price. Upon which, Tarquin consulting the pontiffs, was advised to buy them. These books were in such esteem, that two magistrates were created to consult them upon extraordinary occasions.

AMALTHEA, in pagan mythology, the daughter of Meliflus, king of Crete, and the nurse of Jupiter, whom she fed with goat's milk and honey. Accord-

ing

Amalthæus
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Amapalla.

ing to others, Amalthæa was a goat, which Jupiter translated into the sky, with her two kids, and gave one of her horns to the daughters of Meliflus, as a reward for the pains they had taken in attending him. This horn had the peculiar property of furnishing them with whatever they wished for; and was thence called the *cornucopia*, or horn of plenty.

AMALTHÆUS (Jerome, John Baptista, and Corneille), three celebrated Latin poets of Italy, who flourished in the 16th century. Their compositions were printed at Amsterdam in 1685. One of the prettiest pieces in that collection is an epigram on two children, whose beauty was very extraordinary, though each of them was deprived of an eye:

‘Lumine Acon dextro, capta est Leonilla sinistro:

‘Et poterat forma vincere uterque deos.

‘Parve puer, lumen quod habes concede foriori;

‘Sic tu cæcus Amor, sic erit illa Venus.’

AMAMA (Sixtinus), professor of the Hebrew tongue in the university of Franeker, a man of great learning, was born in Friesland, and had studied under Drusius. He published a criticism upon the translation of the Pentateuch; collated the Dutch translation of the Bible with the original and the most accurate translations; and wrote a censure of the Vulgate translation of the historical books of the Old Testament, Job, the Psalms, and Canticles. It is impossible to answer the reasons whereby he shews the necessity of consulting the originals. This he recommended so earnestly, that some synods, being influenced by his reasons, decreed, that none should be admitted into the ministry but such as had a competent knowledge of the Hebrew and Greek text of the Scripture. He died in 1629.

AMANCE, a town in the duchy of Lorraine, upon a rivulet of the same name. E. Long. 6. 10. N. Lat. 48. 45.

AMAND (St), a city of France, in Bourbonnois, on the confines of Berry, seated upon the river Cher. It was built in 1410 on the ruins of Orval. E. Long. 3. 30. N. Lat. 46. 32.

AMAND (St), a city of the Low Countries, in the earldom of Flanders, seated upon the river Scarpe. It contains about 600 houses, and 3000 or 4000 inhabitants. The abbot of the place is the temporal lord, and disposes of the magistracy. It was given to France by the treaty of Utrecht. E. Long. 2. 35. N. Lat. 50. 27.

AMANICÆ PYLÆ, (Ptolemy); AMANIDES PYLÆ, (Strabo); AMANI PORTÆ, (Pliny): traits or defiles in mount Amanus, through which Darius entered Cilicia; at a greater distance from the sea than the Pylæ Ciliciz or Syrie, through which Alexander passed.

AMANTEA, a sea-port town and bishop's see of the kingdom of Naples, situated near the bay of Euphemia, in the province of Calabria, in E. Long. 16. 20. N. Lat. 39. 15.

AMANUS, a mountain of Syria, separating it from Cilicia; a branch of mount Taurus, (Cicero, Strabo, Pliny); extending chiefly eastward, from the sea of Cilicia, to the Euphrates: now called *Monte Negro*, or rather *Montagna Neres*, by the inhabitants; that is, the watery mountain, as abounding in springs and rivulets.

AMAPALLA, a city and port-town of north America, in the province of Guatimala, seated on the

gulph of the same name, in the Pacific ocean. W. Amaranthe
Long. 63. 20. N. Lat. 12. 30.

AMARANTE, an order of knighthood, instituted in Sweden by Queen Christina, in 1653, at the clofe of an annual feast, celebrated in that country, called *Wirschaft*. This feast was solemnized with entertainments, balls, masquerades, and the like diversions, and continued from evening till the next morning.—That princefs, thinking the name too vulgar, changed it into that of the *feast of the gods*, in regard each person here represented some deity as it fell to his lot. The Queen assumed the name of *Amarante*; that is, unfading, or immortal. The young nobility, dressed in the habit of nymphs and shepherds, served the gods at the table.—At the end of the feast, the queen threw off her habit, which was covered with diamonds, leaving it to be pulled in pieces by the mafques; and, in memory of so gallant a feast, founded a military order, called in Swedish *Cefchiltschafft*, into which all that had been present at the feast were admitted, including 16 lords and as many ladies, besides the queen. Their device was the cypher of *Amarante*, composed of two A's, the one erect, the other inverted, and interwoven together; the whole inclosed by a laurel crown, with this motto, *Dolce nella memoria*.

Bullstrode Whitlock, the English ambassador from Cromwell to the court of Sweden, was made a knight of the order of *Amarante*: on which account it seems to be, that we sometimes find him styled Sir Bullstrode Whitlock.

AMARANTHOIDES, in botany, the trivial name of a species of illecebrum. See ILLECEBRUM.

AMARANTHUS, (of a privative, and *maraino* to wither, because the flower of this plant when cropped does not soon wither,) AMARANTH, or FLOWER-GENTLE; a genus of the pentandria order belonging to the monœcia class of plants.

Species. Of this genus, Linnæus enumerates 19 species; the most remarkable of which are the following. 1. The tricolor, or three-coloured amaranthus. This has been long cultivated in gardens, on account of the beauty of its variegated leaves, which are of three colours, green, yellow, and red; and very elegantly mixed. When the plants are in full vigour, the leaves are large, and closely set from the bottom to the top of the stalks, and the branches form a sort of pyramid; so that there is not a more beautiful plant than this, when it is in full lustre. 2. The melancholicus, bicolor, or two-coloured amaranthus. This greatly resembles the former in its manner of growth; but the leaves have only two colours, which are an obscure purple, and a bright crimson. These are so blended as to set off each other, and, when the plants are vigorous, make a fine appearance. 3. The trifist, with oval heart-shaped leaves. This has very little beauty; and is mentioned only on account of its being used by the Indians as an esculent plant, and substituted for spinach. 4. The caudata, with very long hanging cylindrical spikes. This species is a native of America. It hath an upright stem three feet high; the leaves and stalks are of a pale green colour. The spikes of flowers are produced from the wings of the stalks, and also at the extremities of the branches. They are of a bright purple colour, and hang downward, sometimes to the length of two feet and an half, so that many of them

Amarante
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Amaranthus.

Amaranthus.

them touch the ground. 5. The maximus, or tree-like amaranthus, grows with a strong stem, to the height of seven or eight feet. Towards the top it sends forth many horizontal branches, garnished with oblong rough green leaves. At the extremity of every shoot, the cylindrical spikes of flowers are produced. They are of a purple colour, and hang downward like the last; but are seldom half the length, tho' much thicker than the former. 6. The lividus, with roundish spikes of flowers. This grows near three feet high, putting out several side-branches, which are garnished with oval blunt leaves. At the ends of the branches the spikes of flowers are produced in clusters, and grow erect. These are of a deep purple colour. 7. The flavus, with oval pointed leaves. This grows naturally in Portugal, where it is accounted a culinary herb. It grows to the height of four feet; the stalks are inclined to red; the leaves are of an oval figure, marked with purple spots, and have very long foot-stalks. The spikes of flowers are of a pale green colour, and grow erect. They come out from the extremity of the branches in clusters, and also from the wings of the stalks. 8. The fanguineus, with compound spikes, and oblong oval leaves. This is a native of the Bahama islands. It is an esculent plant, and bears fine flowers. It grows to the height of three feet, with purple stalks and leaves. The spikes are short and cylindrical, of a bright purple at first, but afterwards fade to a darker colour. They are frequently produced from the wings of the stalks; but at the extremity of the stalk arises a large cluster of spikes, which are placed cross-wise, with one upright stalk in the middle. 9. The oleraceus, with obtuse indented leaves. This has no beauty; but it is used by the Indians as a substitute to spinach, to which, however, it is greatly inferior.

Culture. The species most worthy of cultivation are the first and second. Next to these are the fourth, fifth, and eighth sorts.—The two first being tender plants, require some art and care to bring them to perfection in Britain. They should be sown on a good hot-bed in February, or in the beginning of March; and in about a fortnight's time the plants will rise. Another hot-bed must then be prepared, covered with fine mould to about four inches deep, and the young plants must be carefully raised, and removed from the other, and planted at about four inches distance every way, and gently watered, to settle the earth to their roots. In the middle of the day they must be screened with mats from the heat of the sun; and they must have air given them, by raising the glass that covers the bed; and the glasses must be either turned, or wiped from their moisture, as often as they appear wet. In about three weeks or a month's time, these plants will have grown so large as to require another hot-bed; this must be of a moderate temperature, and covered six inches deep with fine earth: then take them carefully up, and preserve as much of the earth about their roots as may be, and plant them in this bed at eight inches distance; then let them be watered frequently a little at a time, and shaded with mats in the heat of the day. In the beginning of May another hot-bed must be prepared, with a deep frame, that the plants may have room to grow: in this set as many pots as it will conveniently hold; let these be filled with fresh earth, and the intermediate spaces every way be filled also with earth.

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The plants are now to be raised with as much earth about their roots as may be, and planted in these pots. In about three weeks more, these plants will be grown to a large size, and must have air given them more and more every day in good weather; and in July they are to be set out in their places, often watering them. The seeds of the fourth, fifth, and eighth species, should be sown upon a moderate hot-bed, towards the end of March; and when the plants come up, they should have a large share of air admitted to them in mild weather, to prevent their drawing up weak. When they are large enough to transplant, another moderate hot-bed must be provided, in which they should be planted at six inches distance every way, observing to water them, as also to shade them from the sun, until they have taken new root. After this the air may be freely admitted to them at all times, when the weather is favourable; their waterings should be frequent, but not in great quantities. As the plants advance, and the warmth of the season increases, they should have a greater share of air, that by degrees they may be hardened to bear the open air. The beginning of June they may be taken up, with large balls of earth to their roots, and planted, some into pots, and others into borders, observing to shade them well until they have taken good root; after which they must be watered frequently, especially those in the pots, which in warm dry weather will require it every evening. The fifth sort will not thrive in pots; so should be planted in a rich, light soil; where if it is allowed room, and plentifully watered in dry weather, the plants will grow to a very large size, and make a fine appearance.

Where people are curious in having these annual plants in great perfection, there should be a glass-case erected, with upright and sloping glasses on every side, with a pit in the bottom for tan, in which the pots should be plunged. If this is raised eight or nine feet to the ridge, and the upright glasses are five feet, there will be room enough to raise these and other annual plants to great perfection; and, in such a building, many tender vegetables, which rarely perfect their seeds in this climate, may be every year brought forward so as to ripen their seeds.

AMARANTHUS CRISTATUS. See CELOSIA.

AMARYLLIS, LILY DAFODIL; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. 1. The lutea, or autumnal narcissus. This is usually sold by gardeners, along with colchicums, for autumnal ornaments to gardens. For this purpose it is very proper, as it will keep flowering from the beginning of September to the middle of November, provided the frost is not so severe as to destroy the flowers. Although there is but one flower in each cover, yet there is a succession of flowers from the same root, especially when they are suffered to remain three or four years unremoved. The flowers seldom rise above three or four inches high. They are shaped somewhat like the flowers of the yellow crocus; the green leaves come up at the same time, like the saffron; and, after the flowers are past, the leaves increase all the winter. The roots are bulbous, and shaped like those of the narcissus; so are proper ornaments for such borders as are planted with cyclamens, saffron, autumnal crocus, colchicums, and such low autumnal flowers. 2. The alta-

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masco,

Amaranthus.
Amaryllis.

Amaryllis.

mafco, or atamufco lily, is a native of Virginia and Carolina, where it grows plentifully in the fields and woods, making a very beautiful appearance when in flower. The flowers of this fort are produced fingle; and, at their firft appearance, have a fine carnation colour on the outside: but this fades away to a pale, or almost white colour, before they decay. The flowers of this fort are almost as large as thofe of the fmall orange-lily, but do not grow above fix or eight inches high. They appear the latter end of May, or beginning of June, or fometimes it flowers in Auguft in this country. 3. The formofilima, or jacobæa lily, produces its flowers two or three times in a year, without being regular to any feafon. The flowers are of a deep red, the under petals very large, and the whole flower ftands nodding on one fide of the ftalk, making a beautiful appearance. The ftems of thefe flowers are produced from the fides of the bulbs; fo that when the flowers produced on one fide are decayed, another ftalk arifes from the other fide of the bulb; but there is no more than one flower produced on the fame ftalk. When the roots are in vigour, flowers will be produced from March to the beginning of September. 4. The farnienfis, or Guernfey lily, is fuppofed to have come originally from Japan, but has been many years cultivated in the gardens of Guernfey and Jerfey; in both which places they feem to thrive as well as if it was their native country, and from thefe iflands their roots are fent annually to the curious in moft parts of Europe. The flowers of this fpecies are admired for the richnefs of their colour, which is commonly red, though they have no fcent. They appear towards the end of September; and, if properly managed, will continue a month in beauty. The roots of thefe plants do not flower again the fucceeding year, as is the cafe with many other bulbs: but if their bulbs contain two buds in their centre, which is often the cafe, they frequently flower twice in three years; after which the fame individual root does not flower again in feveral years, but only the offets from it. 5. The regina, or belladonna lily, is a native of Portugal, where it was formerly cultivated in great plenty; but of late it has been fupplanted by the jacobæa lily, fo that the roots which have been brought from that country for fome time paft, for the belladonna, have generally proved the jacobæa lily. This kind, if properly managed, will fometimes put out two or three ftems, growing near three feet high, and produce many flowers in each umbel, which make a fine appearance during the month of October. 6. The belladonna, or Mexican lily, feldom rifes more than one foot high; each ftem fupporting two, three, or four flowers, but rarely more than that number. The flowers are of a bright copper colour, inclining to red; the fpatha or fheath, which covers the buds before they open, divides into two parts to the bottom, ftanding on each fide the umbel of the flowers, joined to the fmall footftalks. 7. The longifolia, with many flowers in one cover, produces, in each umbel, a great number of flowers, which appear in December: on which account they are the more valuable, there being few flowers at that feafon. They are of a deep purple colour; but the ftalk, which fupports them, feldom rifes to more than three or four inches high. The roots of this fpecies are large, and the leaves long and narrow. 8. The zeylanica, or Ceylon lily, is a

native of the Weft Indies, and ufually flowers in June. Sometimes the fame root will flower again in autumn, but the flowers are of no long duration. 9. The ciliaris, or African fcarlet lily, feldom flowers in Britain. The leaves are long and narrow, not unlike the fnow-drop. The roots are fmall: the petals of the flower turn back, like thofe of the Guernfey lily; but are of a lighter colour, inclining to fcarlet. 10. The vernalis, or fpring yellow lily narcissus, grows naturally in Spain and Portugal, where it flowers early in January. In this country it flowers in April and the beginning of May; but the flowers are of no long duration. It was formerly kept in feveral curious gardens; but as it flowers at a feafon when there are fo many finer kinds in beauty, it was neglected, fo that it is at prefent almost loft in Britain. 11. The orientalis, or lily daffodil, with leaves shaped like a tongue. This is a native of the Cape of Good Hope. The bulbs of the root are large and almost round; the leaves long, broad, and rounded at their extremities; thefe fpread two ways on the furface of the ground, and do not come up till after the flower-ftem appears, which is generally in November. After the flowers are paft, the leaves increafe till fpring, and in May they begin to decay; fo that from the middle of June to October, the roots are entirely deftitute of leaves. 12. The capensis, with three leaves in one cover. This is alfo a native of Africa. The ftems rife near two feet high, and have commonly three flowers inclofed in each fheath or cover. The flowers appear in February and March. They are as large as thofe of the belladonna lily, and of the fame form, but of a deeper red colour. The leaves are long and narrow; have a hollow furrow on their upper fide, where there is a pale ftripe running the length of the leaves; and are very like thofe of the American pancratium. Thefe leaves decay in fummer, about the fame time as thofe of the former, and appear again at the fame feafon.

Culture. The firft fort is very hardy, and will thrive in almost any foil or fituation; but will fucceed beft in a frefh light dry foil, and not too near the dripping of trees, or too near walls. It increafes very faft by offets, by which all the other fpecies are alfo to be propagated. Thefe roots may be tranfplanted any time from May to the end of July; after which it will be too late to remove them.—The fecond kind is likewise hardy enough to thrive in the open air in Britain, provided the roots are planted in a warm fituation, and in a dry foil.—The jacobæa ought to be kept in a moderate ftove all winter; in which cafe it will fend forth plenty of offets, that will produce vigorous plants.—The roots of the Guernfey lily are generally brought over in June and July; but the fooner they are taken out of the ground after the leaves decay, the better: for, altho' the roots which are taken up when their flower-ftems begin to appear, will flower; yet their flowers will not be fo large, nor will their roots be near fo good after, as thofe which were removed before they fent forth frefh fibres.

When thefe roots come over, they fhould be planted in pots filled with frefh, light, fandey earth, mixed with a little very rotten dung, and placed in a warm fituation, obferving now and then to refrefh the earth with water: but by no means let them have too much wet, which would rot their roots, efpecially before they come

Plate XI.
fig. 1.

up.

Amaryl-
lis
Amatori-
li.

up. About the middle of September, such of the roots as are strong enough to flower, will begin to show the bud of their flower-stem; therefore these pots ought to be removed into a situation where they may have the benefit of the sun, and be sheltered from strong winds; but by no means place them too near a wall, nor under glasses, as this would draw them up weak, and render them less beautiful. At this season they should be gently refreshed with water, if the weather be warm and dry; but if wet, they should be screened from it.

When the flowers begin to open, the pots should be removed under shelter, to prevent the flowers from being injured by too much wet: but they must not be kept too close, nor placed in a situation too warm, as this would occasion their colour to be less lively, and hasten their decay.—After the flowers are decayed, the green leaves will begin to shoot forth in length; and, if sheltered from severe cold, will continue growing all winter: but they must have as much free air as possible in mild weather, and are to be covered only in great rains or frosts. For this purpose, a common hot-bed frame is the most proper shelter for them; the glasses of which may be taken off every day in dry open weather, which will encourage the leaves to grow strong and broad. The roots should be transplanted every fourth or fifth year, toward the end of June, or beginning of July; the offsets also should be taken off, and planted in pots, where in three years time they will produce flowers.

The other species of the amaryl-*lis* may easily be raised by taking care to shelter them in a stove from the winter's cold.

AMARYNTHUS, (anc. geogr.) a hamlet of Eretrias, in the island of Eubœa, about seven stadia distant from its walls, (Strabo.) Here Diana was worshipped by an annual solemnity, at which those of Carystus assisted; hence the title of the goddess was *Amarynthis*, and *Amaryssa*, (Livy, Pausanias).

AMASIA, an ancient town of Turkey, in Natolia, remarkable for the birth of Strabo, the geographer. It is the residence of a bashaw, and gives its name to the province it stands in, where there are the best wines and the best fruits in Natolia. It is seated near the river Cafalmack. E. Long. 36. 10. N. Lat. 39. 33.

AMATHUS, a very ancient town in the south of Cyprus, (Strabo, Ptolemy); so called, from Amathus the founder; or, according to others, from *Amath*, a Phœnician town sacred to Venus, with a very ancient temple of Adonis and Venus: and hence Venus is denominated *Amathusia*, (Tacitus). According to Ovid, it was a place rich in copper-ore, and where the inhabitants became *Cerasia*, or horned. Now called *Limisso*.

AMATHUS, (Josephus), a town of the tribe of Gad, beyond Jordan; but whether at a greater or less distance from it, is not so easy to determine. Eusebius places it in the Lower Perzæ; Reland, in Ramoth-Gilead: Gabinius, proconsul of Syria, established five juridical conventions in Judea; two of which were on the other side Jordan; one at Gadara, the other at Amathus, (Josephus).

AMATORII MUSCULI, in anatomy, a term sometimes used for the obliquus superior and obliquus inferior muscles of the eye, as these muscles assist in oggling or drawing the eye sideways.

AMATRICE, a city of the kingdom of Naples, in the farther Abruzzo, upon the confines of the pope's territories, and the marquise of Ancona.

AMAUROSIS, in medicine, a distemper in the eye, occasioned by an insensibility of the retina*.

AMAZONS, a nation of female warriors, whose existence has been esteemed merely fabulous by Strabo, Arrian, Palephates, and some of the moderns: while others maintain that their existence is sufficiently proved, by the testimony of such of the historians of antiquity as are most worthy of credit; by the monuments which many of them have mentioned; and by medals, some of which are still remaining; and that there is not the least room to believe that what is said of them is fabulous.

The Scythians had a great part of Asia under their dominion upwards of 400 years, till they were conquered by Ninus, the founder of the Assyrian empire. After his death, which happened about 1150 years before the Christian æra, and that of Semiramis and their son Ninias, Ilmus and Scolopites, princes of the royal blood of Scythia, were driven from their country by other princes, who like them aspired to the crown. They departed with their wives, children, and friends; and being followed by a great number of young people of both sexes, they passed into Asiatic Sarmatia, beyond mount Camassus, where they formed an establishment, supplying themselves with the riches they wanted, by making excursions into the countries bordering on the Euxine Sea. The people of those countries, exasperated by the incursions of their new neighbours, united, surprisèd, and massacred the men.

The women then resolving to revenge their death, and at the same time to provide for their own security, resolved to form a new kind of government, to chuse a queen, enact laws, and maintain themselves, without men, even against the men themselves. This design was not so very surprising as at first sight appears: for the greatest number of the girls among the Scythians had been inured to the same exercises as the boys; to draw the bow, to throw the javelin, to manage other arms; to riding, hunting, and even the painful labours that seem reserved for men; and many of them, as among the Sarmatians, accompanied the men in war. Hence they had no sooner formed their resolution, than they prepared to execute it, and exercised themselves in all military operations. They soon secured the peaceable possession of the country; and not content with shewing their neighbours that all their efforts to drive them thence or to subdue them were ineffectual, they made war upon them, and extended their own frontiers. They had hitherto made use of the instructions and assistance of a few men that remained in the country; but finding at length that they could stand their ground, and aggrandize themselves, without them, they killed all those whom flight or chance had saved from the fury of the Sarmatians; and for ever renounced marriage, which they now considered as an insupportable slavery. But as they could only secure the duration of their new kingdom by propagation, they made a law to go every year to the frontiers, to invite the men to come to them; to deliver themselves up to their embraces, without choice on their part, or the least attachment; and to leave them as soon as they were pregnant. All those whom age rendered fit for propagation, and were

Amatrice
||
Amazons.

* See Medicine, under n° 790.

Amazons.

willing to serve the state by breeding girls, did not go at the same time in search of men: for in order to obtain a right to promote the multiplication of the species, they must first have contributed to its destruction; nor was any thought worthy of giving birth to children, till she had killed three men.

If from this commerce they brought forth girls, they educated them; but with respect to the boys, if we may believe Justin, they strangled them at the moment of their birth: according to Diodorus Siculus, they twisted their legs and arms, so as to render them unfit for military exercises; but Quintus Curtius, Philostrates, and Jordanus, say, that the less savage sent them to their fathers. It is probable, that at first, when their fury against the men was carried to the greatest height, they killed the boys: that when this fury abated, and most of the mothers were filled with horror at depriving the little creatures of the lives they had just received from them, they fulfilled the first duties of a mother; but, to prevent their causing a revolution in the state, maimed them in such a manner as to render them incapable of war, and employed them in the mean offices which these warlike women thought beneath them: in short, that, when their conquests had confirmed their power, their ferocity subsiding, they entered into political engagements with their neighbours; and the number of the males they had preferred becoming burthenome, they, at the desire of those who rendered them pregnant, sent them the boys, and continued still to keep the girls.

As soon as the age of the girls permitted, they took away the right breast, that they might draw the bow with the greater force. The common opinion is, that they burnt that breast, by applying to it, at eight years of age, hot iron, which infensibly dried up the fibres and glands: some think that they did not make use of so much ceremony, but that when the part was formed they got rid of it by amputation: some, again, with much greater probability, assert, that they employed no violent measures; but, by a continual compression of that part from infancy, prevented its growth, at least so far as to hinder its ever being incommodious in war.

The Amazons were commonly clothed in the skins of the beasts they killed in hunting; which were tied on the left shoulder, and, leaving the right side uncovered, fell down to their knees. In war, the queens and other chiefs carried a corselet, or slight armour for the body, formed of small pieces of iron, in the manner of leaves or scales, fastened by a girdle, below which the coat of arms hung to the knee. The head was armed with a helmet and plume of feathers. The rest of their arms were a bow and arrows, lances, javelins, a battle-axe (said to be invented by Penthesilea one of their queens), and buckler nearly in the form of a crescent, about a foot and a half in diameter, with the points upward. Thalestris appeared before Alexander with two lances in her hand, though she only came to make him a gallant request. Those who accompanied her bore battle-axes with two edges, the handles of which were as long as the wood of a javelin.

They are said to have made great conquests, and to have obtained very extensive dominions, particularly Crimea and Circassia; and to have rendered Iberia, Colchis, and Albania, tributary to them. They enjoyed their power for several centuries; but an expedition in-

to Greece, and into the island of Achilles, is said to have ruined their empire.

The *AMAZONS of Africa* were female warriors, who were obliged to continue virgins to a certain period of their military service. When that period was elapsed, they married, merely with the view of propagating the species. All the offices of state were filled by them. The men were employed in domestic affairs, and passed their whole life in the house, as women did in other countries: for these imperious females usurped from them every function that might awake their valour. As soon as the Amazons were delivered, they committed their children to the care of the men, who nourished them with milk, and other food proper for infancy. If the child was a female, they burned its breasts to prevent their growth, which would have been inconvenient in battle. Historians inform us, that they inhabited an island which was called Hesperia, because it lay to the west of the lake Tritonis.

AMAZONS, (the river of), called by the Spaniards *Maranon*, is the greatest river in the world. It received the name of *Amazons*, because the Spaniards who first passed through the country on its banks, having some smart skirmishes with the natives, and afterwards examining the slain, found the bodies of some women among them. Orellana was the first who discovered this river, about the year 1539. The Maranon, after issuing from the lake from whence it takes its rise, in about eleven degrees of south latitude, runs towards the north to Jaen de Bracamoros, for the length of six degrees, from whence it directs its course towards the east, almost parallel to the equinoctial line, as far as the north cape, where it discharges itself into the ocean directly under the equator, by a mouth 50 or 60 leagues broad. It runs from Jaen, where it begins to be navigable, thirty degrees of longitude, according to Condamine, who was sent into these parts by the French king to discover the true measure of the earth. This is equal to 1800 miles of 60 to a degree. But if the turnings and windings are reckoned, it will then be at least 2700 miles. It receives from the north and south a prodigious number of rivers, some of which run 1500 miles, and are not inferior to the Danube or Nile. The country through which this river runs, is very little known to the Europeans.

AMBA, an Abyssinian or Ethiopic word, signifying a rock. The Abyssinians give names to each of their rocks, as *Amba-Dorbo*, the rock of a hen, &c. Some of these rocks are said to have the name of *Aorni*; and are of such a stupendous height, that the Alps and Pyrenees are but low hills in comparison of them. Amongst the mountains, and even frequently in the plains, of this country, arise steep and craggy rocks of various forms, some resembling towers, others pyramids, &c. so perpendicular, and smooth on the sides, that they seem to be works of art; inasmuch, that men, cattle, &c. are craned up by the help of ladders and ropes: and yet the tops of these rocks are covered with woods, meadows, fountains, fishponds, &c. which very copiously supply the animals seated thereon with all the conveniences of life. The most remarkable of these rocks is called *Amba-Gelphen*. It is prodigiously steep, in the form of a castle built of free-stone, and almost impregnable. Its summit is about half a Portuguese league in breadth, and the circumference at the bottom about half,

Amazons,
Amba,

Ambages half a day's journey. The ascent at first is easy; but grows afterwards so steep, that the Abassine oxen, which will otherwise clamber like goats, must be craned up, and let down with ropes. Here the princes of the blood were formerly confined, in low cottages amongst shrubs and wild cedars, with an allowance barely sufficient to keep them alive. There is, according to Kircher, in this country, a rock so curiously hollowed by nature, that at a distance it resembles a looking-glass; and opposite to this, another, on the top of which nothing can be so softly whispered that it may be heard a great way off. Between many of these rocks and mountains, are vast abysses, which appear very dreadful to the eye.

AMBAGES. See **CIRCUMLOCUTION**.

AMBARVALIA, in antiquity, a ceremony among the Romans, when, in order to procure for the gods an happy harvest, they conducted the victims thrice round the corn-fields in procession, before sacrificing them.—*Ambarvalia* were either of a private or public nature: the private were performed by the master of a family; and the public by the priests who officiated at the solemnity, called *fratres ovales*. The prayer preferred on this occasion, the formula of which we have in *Cato de Re Rustica*, cap. cxlii. was called *carmen ambarvale*. At these feasts they sacrificed to Ceres a sow, a sheep, and a bull or heifer, whence they took the name of *suovetaurilia*. The method of celebrating them, was, to lead a victim round the fields, while the peasants accompanied it, and one of their number, crowned with oak, hymned forth the praises of Ceres, in verses composed on purpose. This festival was celebrated twice a-year; at the end of January, according to some, or in April, according to others; and for the second time, in the month of July.

AMBASSADOR, or EMBASSADOR, a public minister sent from one sovereign prince, as a representative of his person, to another.

Ambassadors are either ordinary or extraordinary. Ambassador *in ordinary*, is he who constantly resides in the court of another prince, to maintain a good understanding, and look to the interest of his master. Till about two hundred years ago, ambassadors in ordinary were not heard of: all, till then, were ambassadors *extraordinary*; that is, such as are sent on some particular occasion, and who retire as soon as the affair is dispatched.

By the law of nations, none under the quality of a sovereign prince can send or receive an ambassador. At Athens, ambassadors mounted the pulpit of the public orators, and there opened their commission, acquainting the people with their errand. At Rome, they were introduced to the senate, and delivered their commissions to the fathers.

Ambassadors should never attend any public solemnities, as marriages, funerals, &c. unless their masters have some interest therein: nor must they go into mourning on any occasions of their own, because they represent the person of their prince. By the civil law, the moveable goods of an ambassador, which are accounted an accession to his person, cannot be seized on, neither as a pledge, nor for payment of a debt, nor by order or execution of judgment, nor by the king's or state's leave where he resides, as some conceive; for all actions ought to be far from an ambassador, as well that which toucheth his necessities, as his person: if, therefore, he

hath contracted any debt, he is to be called upon kindly; and if he refuses, then letters of request are to go to his master. Nor can any of the ambassador's domestic servants that are registered in the secretaries of state's office be arrested in person or goods; if they are, the process shall be void, and the parties suing out and executing it shall suffer and be liable to such penalties and corporal punishment as the lord chancellor or either of the chief justices shall think fit to inflict. Yet ambassadors cannot be defended when they commit any thing against that state, or the person of the prince, with whom they reside; and if they are guilty of treason, felony, &c. or any other crime against the law of nations, they lose the privilege of an ambassador, and may be subject to punishment as private aliens.

AMBE, in *surgery*, the name of an instrument for reducing dislocated bones. In *anatomy*, a term for the superficial jutting out of a bone.

AMBER, in natural history. See the article **SUC-CINUM**; and **CHEMISTRY**, n° 313, 511.

AMBERG, a city of Germany, the capital of the palatinate of Bavaria, with a good castle, ramparts, bastions; and deep ditches. It is seated near the confines of Franconia, on the river Wils. It drives a great trade in iron and other metals, found in the neighbouring mountains. E. Long. 12. 4. N. Lat. 29. 46.

AMBERGREASE, or **AMBERGRISSE**, in natural history, is a solid, opaque, ash-coloured, fat, inflammable substance, variegated like marble, remarkably light, rugged and uneven in its surface, and has a fragrant odour when heated. It does not effervesce with acids; it melts freely over the fire, into a kind of yellow resin; and is hardly soluble in spirit of wine.

Amergrise is in general the most agreeable of the perfumes, and rarely accompanied with the inconveniences which other substances of this class frequently occasion. It is looked upon as an high cordial; and esteemed of great service in all disorders of the head, and in nervous complaints: a solution of it in spirit distilled from roses, stands recommended by Hoffman as one of the most efficacious corroborants of the nervous system. The Orientals entertain an high opinion of the aphrodisiac virtues of this concrete; and likewise suppose that the frequent use of it conduces to long life.

Amergrise is found in great quantities in the Indian ocean, near the Molucca isles; as also near Africa; and sometimes near the northern parts of England, Scotland, and Norway. There have been many different hypotheses concerning its origin; but the most probable is that which supposes it to be a fossil bitumen, or naphtha, exuding out of the bowels of the earth, in a fluid form, and distilling into the sea, where it hardens and floats on the surface. See **CHEMISTRY**, n° 513.

AMBERT, a small town of France, in Lower Auvergne, the chief place of a small territory called *Livradoir*. It is remarkable for its paper manufactory and camblets. E. Long. 3. 35. N. Lat. 45. 28.

AMBETTUWAY, in botany, a barbarous name of a tree, the leaves of which, when boiled in wine, are said to create an appetite, and is used by the people in Guinea with that intention.

AMBIANI, or AMBIANENSIS CIVITAS, now *Amiens*, a city of Picardy. It is called *Samarobriwa* by Cæsar and Cicero; which, according to Valesius, signifies the bridge of the *Samar* or *Somme*. *Ambiani* is a later name,

Ambidex-
ter
||
Ambit.

name, taken from that of the people, after the usual manner of the lower age.

AMBIDEXTER, a person who can use both hands with the same facility, and for the same purposes, that the generality of people do their right hands.—As to the natural cause of this faculty, some, as Hæfer, attribute it to an extraordinary supply of blood and spirits from the heart and brain, which furnish both hands with the necessary strength and agility: others, as Nicholas Massa, to an erect situation of the heart, inclining neither to the right-hand nor left; and others to the right and left subclavian arteries being of the same height, and the same distance from the heart, by which the blood is propelled with equal force to both hands.—But these are only conjectures, or rather chimeras. Many think, that, were it not for education and habit, all mankind would be ambidexters; and in fact, we frequently find nurses obliged to be at a good deal of pains before they can bring children to forego the use of their left hands. How far it may be an advantage to be deprived of half our natural dexterity, may be doubted. It is certain, there are infinite occasions in life, when it would be better to have the equal use of both hands. Surgeons and oculists are of necessity obliged to be ambidexters; bleeding, &c. in the left-arm or left angle, and operations on the left-eye, cannot be well performed but with the left-hand.—Various instances occur in history, where the left-hand has been exercised preferably to the right. But by the laws of the ancient Scythians, people were enjoined to exercise both hands alike; and Plato enjoins ambidexterity to be observed and encouraged in his republic.

AMBIDEXTER, among English lawyers, a juror or embracer, who accepts money of both parties, for giving his verdict; an offence for which he is liable to be imprisoned, for ever excluded from a jury, and to pay ten times the sum he accepted of.

AMBIGENÆ OVES, in the heathen sacrifices, an appellation given to such ewes as, having brought forth twins, were sacrificed together with their two lambs, one on each side. We find them mentioned among other sacrifices to Juno.

AMBIENT, a term used for such bodies, especially fluids, as encompass others on all sides: thus, the air is frequently called an ambient fluid, because it is diffused round the earth.

AMBIGENAL HYPERBOLA, a name given by Sir Isaac Newton to one of the triple hyperbolas of the second order, having one of its infinite legs falling within an angle formed by the asymptotes, and the other without.

AMBIGUITY, a defect of language, whereby words are rendered ambiguous. See the next article.

AMBIGUOUS, a term applied to a word or expression which may be taken in different senses.—An anonymous writer has published a dictionary of ambiguous words: *Lexicon Philosophicum de Ambiguitate Vocabulorum*, Francof. 1597. 4to.—The responses of the ancient oracles were always ambiguous.

AMBIT, in geometry, is the same with what is otherwise called the perimeter of a figure*.

AMBIT was particularly used, in antiquity, to denote a space of ground to be left vacant betwixt one building and another. By the laws of the twelve ta-

bles, houses were not to be built contiguous, but an ambit or space of $2\frac{1}{2}$ feet was to be left about each for fear of fire.—The ambitus of a tomb or monument, denoted a certain number of feet, in length and breadth, around the same, within which the sanctity assigned to it was limited. The whole ground wherein a tomb was erected, was not to be secreted from the common uses; for this reason, it was frequent to inscribe the ambit on it, that it might be known how far its sanctity extended: thus, in *fronte pedes tot, in agrum pedes tot*.

AMBITIO, (*ambitio*), is generally used in a bad sense, for an immoderate or illegal pursuit of power.

In the strict meaning, however, of the word, it signifies the same with the *ambitus* of the Romans. See the next article.

AMBITUS, in Roman antiquity, the setting up for some magistracy or office, and formally going round the city to solicit the interest and votes of the people.

Ambitus differed from *ambition*, as the former lies in the act, the latter in the mind.

Ambitus was of two kinds; one lawful, the other infamous. The first, called also *ambitus popularis*, was when a person offered his service to the republic frankly, leaving it to every body to judge of his pretensions as they found reasonable. The means and instruments here made use of were various. 1. *Amici*, or friends, under different relations, including *cognati, affines, necessarii, familiares, vicini, tribules, clientes, municipes, sodales, collegæ*. 2. *Nomenclatura*, or the calling and saluting every person by his name; to which purpose, the candidates were attended with an officer, under the denomination of *interpretes, or nomenclator*. 3. *Blanditia*; or obliging persons, by serving them, or their friends, patrons, or the like, with their vote and interest on other occasions. 4. *Prenatio*; the shaking every person by the hand, offering him his service, friendship, &c.—The second kind was that wherein force, cajoling, money, or other extraordinary influence, was made use of. This was held infamous, and severely punished, as a source of corruption and other mischiefs.

Ambitus was practised not only at Rome and in the forum, but in the meetings and assemblies of other towns in Italy, where numbers of citizens were usually found, on account of trade and business.—The practice ceased in the city from the time of the emperors, by reason posts were not then to be had by courting the people, but by favour from the prince.

Persons who had causes depending practised the same, going about among the judges to implore their favour and mercy. They who practised this, were called *Ambitiosi*. Hence we also meet with *ambitiosa decreta*, and *ambitiosa jussa*, used for such sentences and decrees as were thus procured from the judges, contrary to reason and equity, either gratuitously, or for money.

AMBLE, in horsemanship, a peculiar pace by which a horse's two legs of the same side move at the same time.

AMBLESIDE, a town in Westmoreland, seated at one end of Winandermer, W. long. o. 49. N. lat. 54. 30.

AMBLETEUSE, a sea-port town of France, in Picardy, defended with a battery of canon. E. long. 1. 30. N. lat. 49. 40.

AM-

Ambition
||
Ambiteuse

* See Perimeter.

Ambygon
Amboule.

AMBYGON, in geometry, denotes an obtuse-angled triangle, or a triangle one of whose angles consists of more than ninety degrees.

AMBYLOPY, among physicians, signifies an obscuration of the sight, so that objects at a distance cannot be clearly distinguished. The word is Greek; and compounded of *αμβλῶ* dull, and *ὄψ*, the eye.

AMBO, or **AMBON**, a kind of pulpit or desk, in the ancient churches, where the priests and deacons stood to read, or sing part of the service, and preach to the people; called also *Analogueum*. The term is derived from *ἀνὰ κλίμακας*, to mount.—The ambo was mounted upon two sides; whence some also derive the appellation from the Latin *ambo*, both.

The ambo was ascended by steps; which occasioned that part of the office performed there, to be called the *Gradual*. See **GRADUAL**.

Besides the gospel, which was read at the top of the ambo, and the epistle, which was read a step lower, they likewise published from this place the acts of the martyrs, the commemoration of departed saints, and the letters of peace and communion sent by one church to another; here, too, converts made a public profession of their faith; and bishops, their defence, when accused: treaties also were sometimes concluded, and the coronations of emperors and kings performed, in the same place.

The modern reading-desks and pulpits have been generally substituted to the ancient Ambos; though, in some churches, remains of the ambos are still seen. In that of St John de Lateran at Rome, there are two moveable ambos.

AMBOHITSMENE, or **VOHITSANGHOMBE**, a province of the island of Madagascar, so called from some red mountains of the same name, lying in S. lat. 20°. These mountains are very high, resembling the Tafelberg of the Cape of Good Hope. On one side of this ridge the sea extends into the country for fifteen leagues; on the other is a flat country abounding in ponds and marshes. Here is also a lake fifteen leagues in length, and the same in breadth, containing many small islands. The inhabitants of the mountains are called *Zaferahongs*; and have plenty of gold, iron, cattle, silk, &c.

AMBONUM. See **OCULUS BELI**.

AMBOISE, a town of France, in Touraine, seated at the confluence of the rivers Loire and Malfec. E. Lon. 1. 30. N. Lat. 47. 25.

AMBOULE, a province of Madagascar, somewhat to the northward of S. lat. 23°. It is a fertile and agreeable country, watered by the river Manampani, whose mouth lies in S. lat. 23. 30. The country produces plants and fruits in plenty. Iron mines are also found here. The black cattle are extremely fat, and their flesh excellent. In this province stands a large town of the same name; near which is a fountain of hot water, within 20 feet of a small river whose sand is almost burning. The water of the fountain is said to boil an egg hard in two hours; and the inhabitants affirm it to be a sovereign remedy against the gout. The people here are employed in different preparations of iron and steel, which they have from their own mines, and forge several instruments with tolerable skill. Their governor is honoured with the title of *Robertan*, or *Great Lord*. He exercises sovereign authority and ab-

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solute power; but is frequently, in times of distress, surprised by his subjects, who assemble in great numbers, seize his person, and threaten him with death unless they are relieved. To extricate himself from this dilemma, he is instantly obliged to issue orders for distributing provisions among them; but is usually repaid with interest, a quadruple return being made in a plentiful harvest. The people of Amboule live in great licentiousness with their superiors, and their country is generally a retreat for the roguish and lazy.

AMBOYNA, one of the Molucca islands, in the East Indies. It lies in S. lat. 3. 36. and E. long. 126. 20. and is remarkable for being the centre of the commerce for nutmegs and cloves, which is entirely monopolized by the Dutch East-India company. It is about 24 leagues in circumference. The air is but indifferent; and infects the body with a scrophulous disorder, not unlike the French-pox, except it not being so painful, and not corroding the bones. This disorder is said to be easily cured in the first stage; but very difficultly, if allowed to proceed to any height.

The island is fertile in millet, tobacco, sugar, coco, potatoes, oranges, lemons, citrons, &c. Here is likewise the fago tree, a kind of palm, of the pith of which they make bread; and by cutting off one of the branches near the top, the sap will flow out: this juice is very sweet, and will ferment into a sort of wine. A bitter root, called *oubat*, is made use of to prevent it from turning, otherwise it would soon grow sour as vinegar. Some trees will yield 30 quarts in 24 hours.

The men wear large whiskers, and but little hair upon their chin; and have only a slight piece of stuff wrapped round their middle. The women tie their hair in knots: the maids are bought of their fathers before they are married; and if the wife proves barren, the marriage is dissolved. Some of the natives are Mahometans, and some Christians: but they are all said to be lazy, deceitful, and treacherous; and will rather die than leave their ancient customs. They make war with small swift vessels, in shape like dragons with regard to the head and tail. Their houses are built of bamboo canes and fago-trees. They sleep on mats. Their weapons are bows and arrows, javelins, scymitars, and targets. They have likewise trunks, out of which they shoot poisoned arrows. The women are very amorous; and if they are deceived by their gallants, they give them a slow poison, which causes them to linger a great while before they die.

Amboyna was first discovered by the Portuguese, who built a fort upon it, which was taken from them by the Dutch in 1605. They did not, however, become masters of the whole island at once. The English had here five factories, which lived under the protection of the Dutch castle; holding themselves safe, in respect of the friendship between the two nations. Great differences had arisen between the Dutch and English colonists in this part of the world; till at last, the English East-India company applying to King James, a treaty was concluded in 1619, by which the concerns both of the English and Dutch were regulated, and certain measures agreed upon for preventing future disputes. This was an additional security to the English; and, by virtue of the treaty, they continued two years in Amboyna, trading with the Dutch. During this time, however, several differences happened; which occasioning

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cajonning mutual difcontents, the complaints were sent to Jaccatra, in the island of Java Major, to the council of defence of both nations there residing: but they not agreeing, a state of the case was sent over to Europe, to be decided by the East-India Companies of both nations; or, in case they could not agree, by the King of England, and the States of Holland, according to an article in the treaty of 1619.—But before these disputes could be decided in a legal way, the Dutch at Amboyna thought proper to invent a report of a plot intended by the English to surprize the Dutch fort and destroy them.

To give credit to this report, and to obtain a plausible pretext for destroying the English, a Japanese soldier was apprehended for asking some questions at a centinel concerning the strength of the castle. Being cruelly tortured, he signed a confession that he himself and several others of his countrymen had contrived the taking of the castle. Upon this, some other Japanese were also seized and tortured; as also a Portuguese, the guardian of the slaves of the Dutch. This happened about the 11th of February 1622.—At this time there was one Abel Price, surgeon to the English, in prison, for threatening to set a Dutchman's house on fire. Him they tortured, and soon made to confess whatever they pleased. The same day, (Feb. 15th) they sent for Captain Towerfon, and all the English who were in the town, to come to speak with the governor of the castle. They all went except one, who was left to keep the house. Being come to the governor, he told Captain Towerfon, that himself and others of his nation were accused of a conspiracy to surprize the castle; and therefore, until further trial, were to remain prisoners. Immediately also they seized him who was left alone in the house; took the merchandise of the English company into their own custody, by an inventory; and seized all the chests, boxes, books, and papers, in the English house.

The Dutch, having now got them into their power, proceeded to torment them in the most horrid manner. The cruelties practised upon them were of the same nature with those inflicted by the inquisitors on such unhappy people as fell into their hands.—The miserable victim was first hoisted up by the hands with a cord, on a large door, where they made him fast, upon two stapples of iron fixed on both sides at the top of the door-posts, hauling his hands one from the other as wide as they could stretch. Being thus made fast, his feet were also stretched asunder as far as they could, and made fast beneath under the door-tees on each side. Then they tied a cloth about his neck and face, so close that little water could get out. This being done, they poured water softly upon his head, which running down, filled up the napkin, and stretched it out all round. They suffered the water to ascend a little above his nostrils, so that he could not draw breath without sucking in a great quantity of water; with which he soon was filled to such a degree as to be ready to burst. If he happened to faint, which was often the case, the barbarians took him down, making him quickly vomit up the water, and then tied him up again. If this torture did not produce the confession they desired, they burnt the soles of his feet, arm-pits, and the most sensible parts of his body, with candles, till the fat dropped out upon them.

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The unhappy sufferers, exhausted with these tortures, confessed whatever they thought would be agreeable to their savage tormentors; who having caused them sign their confessions, and thereby obtained a colour of justice for their proceedings, put as many to death as they thought proper, and out of their great clemency spared the rest.

That such an unheard-of proceeding as this should neither be reformed by the British, nor the perpetrators of it called to an account in their own country, may appear very surprizing. It must, however, be considered, that at that time the liberty of the press was not so great as it is now. It was not till long after that the account was allowed to be published; and the troubles in which the nation was then involved, prevented much attention being paid to it.

By this transaction, the clove-trade fell entirely into the hands of the Dutch; and the more effectually to preserve it, the company takes care to have all the clove-trees in the adjacent islands grubbed up. Sometimes also, when the harvest is very large, part of the produce of Amboyna itself is burnt.—To prevent the rearing of cloves in any of the neighbouring islands, or the inhabitants from selling them to strangers, the governor of Amboyna makes the tour of his government with a fleet of curricuries, consisting sometimes of 20, and at others of 30, 40, or 50 sail. This expedition is made with all the pomp imaginable, in order to gratify the pride and folly of the Indian chiefs. The true reason of their taking all this pains is, because experience has shewn, that no contracts, however solemn, can prevent the inhabitants of those islands from selling their spice to strangers; and even now, frauds are so frequently practised by the Dutch themselves, tho' the company is inexorable in punishing them, that the common people call the cloves *galcken-kruid*, that is, the gallows-spice.

Besides the cloves, coffee is also cultivated here by the Dutch, and a gold mine has been lately found out. This was discovered by the quantities of gold-dust that were washed from some mountains by the torrents. Here also grows a kind of red wood, which, besides the beauty of its colour, is exceedingly firm and durable; and, which is still more remarkable, its grain is naturally embellished with abundance of beautiful figures. Of this wood they make tables, chairs, escritoires, &c. for the principal persons in the government; and the rest is sold all over the Indies at a very extravagant rate.

Amboyna is divided into two parts, viz. a greater and lesser peninsula. The former, called *Hilton*, is 12 leagues in length, and two and a half broad. In this the Dutch have no less than five forts, or rather strong redoubts, mounted with cannon. The other is called *Leytimor*, five leagues in length, and one and a half broad, which is the southern part of the island; on this stands the fort of *Victoria*, which is the residence of the governor, and his council, composed of 15 gentlemen or merchants. The fortress is a square, the ramparts mounted with 60 pieces of brass cannon, and the garrison usually composed of 600 men. It is so strong by nature and art, as to be in a manner impregnable; and so effectually does it command the harbour, that no vessel could come in or go out without being sunk by the cannon, if the governor chose. The inhabitants of

Amboyna,

Ambracia.

Amboyna, are computed at 70 or 80,000, of whom but a small number are Dutch; and this obliges them to be continually upon their guard, and to keep a competent number of troops in each of their forts, particularly in that of Middleburgh, which stands upon the isthmus that connects these peninsulas. There are also redoubts and garrisons in all the islands of this government.

AMBRACIA, one of the most considerable cities of ancient Epirus, situated on the river Aracthus, at a small distance from the sea. At first it was a free city; but was afterwards reduced by the Ætæidae kings of Epirus, who chose it for the place of their residence. In process of time, the Ætoliens made themselves masters of it, and held it till the year before Christ 189, when it fell into the hands of the Romans.

At this time Ambracia was a place of great strength. It was defended on one side by the river Aracthus, and on the other by steep and craggy hills; and surrounded with an high and thick wall, above three miles in compass. The Roman consul Fulvius began the siege by forming two camps, separated by the river, but with a communication between them; the Romans were posted in one, and the Epirots their allies in the other. He then threw up two lines, one of circumvallation, and the other of contravallation; and built a wooden tower, in form of a castle, over against the citadel, which stood on a hill. The Ætoliens, however, before the lines were quite finished, found means to throw about 1000 men into the place.

The lines being completed, the city was attacked in five different places at once. The battering-rams shook the walls on all sides; and the Romans, from their moveable towers, pulled down the battlements with a kind of fishes which they fastened to long beams. The besieged made a vigorous defence. They were night and day on the walls, and indefatigable in preventing the effects of the rams and fythes. The strokes of the former they deadened, by letting down beams, large stones, lumps of lead, &c. by means of, pulleys, upon them when they were in motion; the others they rendered useless, by pulling the beams to which they were fastened into the city with hooks contrived for the purpose.

While Fulvius was carrying on the siege, Nicander the Ætolian prætor found means to throw 500 men into the city, under the command of one Nicodamus, with whom Nicander agreed to attack the Roman camp in the night-time; not doubting, that, if the garrison from within, and the army from without, fell upon them at the same time, they would be obliged to raise the siege. Nicodamus narrowly watched the time at which he was ordered to fall; and, though Nicander did not appear, marched out at the head of the garrison, armed with fire-brands and torches. The Roman centinels, surprised at this sight, ran to wake the legionaries, and soon spread a general alarm all over the camp. The legionaries marched in small bodies as they happened to meet, to repulse the enemy, whom they engaged in three different places. Two parties of the garrison were driven back: but the third, commanded by two Ætolian generals, made a great slaughter of the Romans; and, not finding themselves seconded by Nicander, retired in good order into the city.

Though the besieged were thus abandoned, and had no hopes of assistance, they continued to defend themselves with incredible vigour and resolution. The Ro-

Ambracia
berry
Ambrones.

mans had no sooner made a breach in the wall, but it was repaired, and a new one built behind it. The consul, therefore, altered his measures; and, instead of making breaches with the ram, began to undermine the wall, in hopes of throwing down great part of it at once, and entering the city before the besieged could have time to build a new wall. The miners being covered, were not observed by the garrison, till the great quantities of earth brought out of the mine gave the alarm. The Ætoliens immediately began to countermine; and, having dug a trench of the depth they supposed the mine to be, they carried it along the wall where they heard the strokes of the pick-axes of the Romans. When the two mines met, a battle ensued, first with pick-axes and spades, and then with swords and spears: but this attack did not last long, each party making themselves a kind of rampart with the loose earth. The Ætoliens, in order to drive their enemies quite out of the mine, invented a machine, which they brought to the place where the two mines met: this was a hollow vessel, with an iron bottom, bored thro' in many places, and armed with spikes at proper distances to prevent the enemy from approaching it: this vessel they filled with feathers, which they set on fire, and with bellows driving the smoke on the besiegers, obliged them to leave the mine, half-suffocated. This interval the Ætoliens made use of in repairing the foundations of the wall.

The vigorous resistance made by the Ambracians, however, did not raise the courage of the nation in general, who were determined on a peace with Rome at all events. Fulvius, in the mean time, being desirous of getting possession of Ambracia before the conclusion of the peace, employed Amyntander, king of the Athamans, to persuade the inhabitants to surrender. As Amyntander had great interest in Ambracia, having long resided there, he easily persuaded them to capitulate on the following terms. *viz.* That the Ætolian garrison should have leave to march out of the city; that the inhabitants should pay 500 talents, 200 down, and the rest at six equal payments; and that they should deliver to the consul all the prisoners and deserters that were in the city. The gates were then opened to Fulvius; and he was presented with a crown of gold, together with many fine statues and pictures, of which there were great numbers in the city, it having been the capital of Pyrrhus, who had enriched it with many valuable monuments.

From this time the city of Ambracia made no figure in history. It is scarce known at present where the city stood; but that called *Arba*, in upper Albania, seems best to agree with what is said of the ancient situation of this city. The river Aracthus, on which Ambracia was situated, is now called, by the natives, *Spagnagmurisi*.

AMBRÉSBERRY, a market-town in Wiltshire, about six miles north of Salisbury, and situated in W. Long. 1. 40. and N. Lat. 51. 20.

AMBRONES, a Gaulish people who lived near the foot of the Alps, between Switzerland and Provence. They invaded the Roman territories in conjunction with the Cimbri and Teutones; but were defeated with great slaughter by Marius, about 101 years before Christ. Their women, who had staid during the engagement in a kind of fortification made with their carts, on see-

N n ing

Ambrose's
Island,
Ambrose.

ing their husbands flying, and the Romans at their heels, armed themselves with axes, and, gnashing with their teeth, fell with fury on the pursuers and the pursued. Their first rage being spent, they desired to surrender themselves, upon the single condition, that their chastity should not be violated; but this equitable request being denied, they first killed their children, and then themselves, not one remaining alive out of the whole multitude.

AMBROSE-ILSAND, a small island laid down in some of the most approved charts, and particularly mentioned in Mr Robertson's Elements of Navigation, as lying in S. Lat. 25. 30. W. Long. 82. 20. It was searched for, however, in 1767, by Captain Carteret, with such diligence, that he concludes it to have no existence, as he could not discover land any where near that place.

AMBROSE (St.), bishop of Milan, one of the most eminent fathers of the fourth century, born in Gaul in the year 333, according to Dr Cave, or in 340, as Mr Du Pin affirms. His father was at this time *præfectus prætorio* in Gaul; and resided at Arles, the capital of Gallia Narbonensis. The birth of Ambrose is said to have been followed with a remarkable presage of his future eloquence; for we are told, that a swarm of bees came and settled upon his mouth as he lay in his cradle. He soon made himself master of the several parts of secular learning; and pleaded causes before Probus with so much eloquence, that he was appointed his assessor, and soon after governor of the provinces of Liguria and Æmilia. He settled at Milan; where, in the year 374, upon the death of Auxentius bishop of that city, there being a great contest between the Catholics and Arians concerning the choice of a new bishop, Ambrose thought it his duty, as governor, to go to the church, in order to compose the tumult. He accordingly addressed himself to the people in a gentle pathetic speech, exhorting them to proceed to their choice in a calm and friendly manner: while he was speaking to them, the whole assembly cried out with one voice, "Let Ambrose be bishop!" Such a sudden and unexpected incident surprised him extremely; so that he retired immediately, and used every method to divert them from their resolution of choosing him: but at last he was obliged to comply; and was baptised, (being but a catechumen before), and ordained bishop, towards the latter end of the year 374, or beginning of 375. About the year 377, the barbarous nations making an incursion into the Roman empire, he fled to Illyricum, and afterwards to Rome. In the year 384, he was sent to the tyrant Maximus, who had usurped the empire, and prevailed upon him not to pass over into Italy. The heathens being encouraged by these intestine commotions in the empire, attempted to restore their religion, and employed Q. Aurelius Symmachus, prefect of Rome, a man of great eloquence, to plead their cause. This gave rise to the famous contest between St Ambrose and him, about repairing the altar of Victory. But Symmachus having lost his cause, was expelled the city, and commanded not to approach within an hundred miles of it. The petition which he presented to the emperor Valentinian the younger, is still extant; we find in it the strongest figures of rhetoric and the greatest force of eloquence. St Ambrose wrote a confutation of this petition; but he has been thought

guilty of many paralogisms: and yet he protests, "that he endeavoured only after the solidity of reasoning, leaving Symmachus all the glory of eloquence and politeness; it being (says he) the peculiar privilege of the pagan philosophers to amuse the mind with colours as false as their idols; and to say great things, not being capable of saying true ones." Ambrose met with a good deal of opposition from the Arians, against whom he acted with great spirit and intrepidity. Justina the empress and mother of Valentinian, who was an Arian, resolving to restore Arianism at Milan, began with demanding of St Ambrose one of the churches, which was called the Portian church: but he refused it; and the people surrounding the palace in a body, she was obliged to leave him in possession of his church, and even desire him to pacify the people.

Ambrose was a second time sent to the tyrant Maximus, for Valentinian found no person so proper to negotiate with him. He spoke to him with great courage and boldness, but could obtain nothing; for Maximus soon after marched into Italy, and made himself master of the western empire: so that Valentinian was obliged to retire, with his mother Justina and his sister Galla, to Thessalonica in Illyricum, in order to desire Theodosius's assistance; who defeated Maximus, and restored Valentinian to the empire.

While Theodosius continued in Italy, after the defeat of Maximus, an insurrection happened at Thessalonica, in which several of the magistrats were stoned, and their bodies dragged along the streets. Theodosius being informed of this, rashly commanded a certain number of the inhabitants to be put to death promiscuously; by which means the city was filled with the blood of many innocent persons, and amongst the rest several strangers who were but just come there: no regard was had to any distinction of persons, no form of trial was observed; but they were cut down like corn in the harvest, as Theodoret expresses it, to the number of 7000. At this time an assembly of bishops was held at Milan, who all expressed an abhorrence of such cruelty in the emperor. Ambrose wrote a letter to him, in which he represented the enormity of his crime, and exhorted him to make satisfaction by a sincere submission and repentance. Sometime after, Theodosius coming to Milan, went to receive the sacrament at the great church; where Ambrose meeting him at the door, denied him entrance, and represented his guilt in the most forcible and pathetic terms. The emperor was struck with his words, and with great uneasiness of mind returned to his palace; but about a year after, Ambrose, being convinced of the sincerity of his repentance, admitted him into the church.

In 392, Valentinian the emperor being assassinated by the contrivance of Arbogastes, and Eugenius usurping the empire, Ambrose was obliged to leave Milan; but he returned the year following, when Eugenius was defeated. He died at Milan the 4th of April 397; being 57 years of age, according to Mr Du Pin and some other writers; but Dr Cave and Olearius say that he was 64 years old at his death. He was buried in the great church at Milan. He wrote several works, the most considerable of which is that *De Officiis*. He is concise and sententious in his manner of writing, and full of turns of wit; his terms are well chosen, and his expressions noble; he diversifies his subject by an admirable

Ambrose.

Ambrose || **Ambrosius.** mirable copiousness of thought and language; he is very ingenious in giving an easy and natural turn to every thing which he treats of, and is not without strength and pathos when there is occasion for it. This is part of the character which Du Pin gives him as a writer; but Erasmus observes that he has many quaint and affected sentences, and frequently very obscure ones; and it is certain that his writings are intermixed with many strange and peculiar opinions. Paulinus wrote his life, and dedicated it to St Augustin: this life is prefixed to St Ambrose's works; the best edition of which is reckoned to be that published by the Benedictine monks, in two volumes in folio, at Paris, in 1686 and 1690.

AMBROSE (Isaac), an eminent presbyterian minister, was educated at Brazen-nose college Oxford, where he took the degree of bachelor of arts, and became minister of Preston, and afterwards of Garlang in Lancashire, where he was in 1662 ejected for non-conformity. It was usual with him to retire every year for a month into a little hut in a wood; where he shunned all society, and devoted himself to religious contemplation. Dr Calamy observes, that he had a very strong impulse on his mind of the approach of death, and took a formal leave of his friends at their house, a little before his departure; and the last night of his life he sent his discourse concerning *angels* to the press. The next day he shut himself up in his parlour, where, to the great surprise and regret of all who saw him, he was found just expiring. He died in 1663-4, in the 72^d year of his age. He wrote several other books; as the *Prima, Media, & Ultima*, or the First, Middle, and Last Things; War with devils; Looking unto Jesus; &c.

AMBROSE, or *St AMBROSE in the Wood*, an order of religious, who use the Ambrosian office, and wear an image of that saint engraven on a little plate: in other respects, they conform to the rule of the Augustines. See *AMBROSIAN OFFICE*, and *AUGUSTINES*.

AMBROSIA, in heathen antiquity, denotes the solid food of the gods, in contradistinction from the drink, which was called *nectar*. It had the appellation *ambrosia*, (compounded of the particle *a*, and *βροσ*, *immortalis*) as being supposed to render those immortal who fed on it.

AMBROSIA, a genus of the pentandria order, belonging to the monœcia class of plants. Of this genus five species are enumerated; but having no properties worthy of notice, we omit any farther account of them.

AMBROSIAN OFFICE, in church-history, a particular formula of worship in the church of Milan, which takes its name from St Ambrose, who instituted that office in the fourth century. Each church originally had its particular office; and when the Pope, in after-times, took upon him to impose the Roman office upon all the western churches, that of Milan sheltered itself under the name and authority of St Ambrose; from which time the Ambrosian ritual has prevailed.

AMBROSIN, in middle-age writers, denotes a coin struck by the lords or dukes of Milan, whereon was represented St Ambrose on horseback, with a whip in his right hand. The occasion of this coinage is said to have been a vision of that saint, who appeared to the Milanese general in 1339, during the time of a battle.

AMBROSIUS AURELIANUS, or **AURELIUS AM-**

BROSIUS, a famous general of the ancient Britons, of Roman extraction. He was educated at the court of Aldroen of Amoria; who, at the request of the Britons, sent him over with ten thousand men, to assist them against the Saxons, whom Vortigern had invited into Britain. Ambrosius had such success against the Saxons, that the Britons chose him for their king, and compelled Vortigern to give up to him all the western part of the kingdom divided by the Roman highway called *Watling-street*. Some time after, the Britons being discontented with Vortigern, and having withdrawn their allegiance from him, he returned to a castle in Wales, where being besieged by Ambrosius, and the castle taking fire, he perished in the flames, and left his rival sole monarch of Britain; who now took upon him the imperial purple, after the manner of the Roman emperors. Geoffrey of Monmouth tells us, that Ambrosius built Stonehenge near Salisbury, in Wiltshire. Ambrosius, according to this historian, coming to a monastery near Caeracadoc, now *Salisbury*, where three hundred British lords, massacred by Hengist, lay buried, and resolving to perpetuate the memory of this action, he ordered his workmen to prepare a large quantity of stones and other materials. But having, at the instigation of Tremouous archbishop of Caerleon, consulted the famous Merlin, this magician advised him to send over to Ireland for certain great stones, called *chorea gigantum*, the giant's dance, placed in a circle on a hill called *Killair*, having been brought thither by giants from the farthest borders of Africa. A body of forces were accordingly sent into Ireland, under Pendragon, Ambrosius's brother, to fetch these stones; but were opposed in their attempt by Giliomanus king of the country, who derided the folly of the Britons in undertaking so ridiculous an expedition. Nevertheless, the Britons having vanquished this prince in battle, brought away the stones; and by the direction and assistance of Merlin, who had accompanied them, these wonderful stones, by order of Ambrosius, were placed over the graves of the British lords, and are now what is called *Stonehenge*. Alexander Mechem celebrates this fable in his poem *De divina sapientie laudibus*. Polydore Virgil assigns another origin of Stonehenge: he tells us it was erected by the Britons as a monument to their general Ambrosius, on the place where he fell in battle, to perpetuate the memory of his glorious actions and services done to his country. Both these stories are rejected by our best antiquaries; who, however, are by no means agreed as to the true origin of this famous piece of antiquity *.

After the Britons had defeated the Saxons, and obliged them to retire northward, Ambrosius is said to have convened the princes and great men at York, where he gave orders for repairing the churches destroyed by the Saxons, and restoring the exercise of religion to its former lustre. This is confirmed by Matthew of Westminster; who highly applauds the great zeal of Ambrosius in repairing the churches, encouraging the clergy, and restoring the honour of religion. The Monmouth historian gives this prince a very high character: "He was a man (says he) of such bravery and courage, that when he was in Gaul no one durst enter the lists with him; for he was fure to unhorse his antagonist, or to break his spear into shivers. He was, moreover, generous in bestowing, careful in perform-

* See *Stonehenge*.

Ambrun
||
Amellus.

ing religious duties, moderate in all things, and more especially abhorred a lie. He was strong on foot, stronger on horseback, and perfectly qualified to command an army." The same author tells us he was poisoned at Winchester by one Eopa a Saxon, disguised as a physician, and hired for that purpose by Pafcentius one of the sons of Vortigern: but the generally received opinion is, that he was killed in a battle which he lost in the year 508, against Cerdric, one of the Saxon generals.

AMBRY, a place in which are deposited all utensils necessary for house-keeping. In the ancient abbey and priories, there was an office under this denomination, wherein were laid up all charities for the poor.

AMBUBAJÆ, in Roman antiquity, were immodest women, who came from Syria to Rome, where they lived by prostitution, and by playing on the flute: the word is derived from the Syriac *ahub*, which signifies a flute; altho' others make it to come from *am* and *Baie*, because these prostitutes often retired to Baie. According to Cruquius, these women used likewise to sell paint for ornamenting the face, &c.

AMBURBIUM, in Roman antiquity, a procession made by the Romans round the city and pomerium, in which they led a victim, and afterwards sacrificed it, in order to avert some calamity that threatened the city.

AMBURY, or ANBURY, among farriers, denotes a tumour, wart, or swelling, which is soft to the touch, and full of blood.

This disorder of horses is cured by tying a horse-hair very hard about its root; and, when it has fallen off, which commonly happens in about eight days, strewing some powder of verdigris upon the part, to prevent the return of the complaint. If the tumour be so low that nothing can be tied about it, they cut it out with a knife, or else burn it off with a sharp hot iron; and, in sinewy parts, where a hot iron is improper, they eat it away with oil of vitriol, or white sublimate.

AMBUSCADE, or AMBUSH, in the military art, properly denotes a place where soldiers may lie concealed, till they find an opportunity to surprize the enemy.

AMBY, a town of the Austrian Netherlands, in the province of Limburg, situated opposite to Maestricht, on the east-side of the river Maese, in E. Long. 5. 45. N. Lat. 50. 57.

AMEDIANs, in church-history, a congregation of religious in Italy, so called from their professing themselves *amantes Deum*, lovers of God; or rather, *amati Deo*, beloved of God.

AMELIA, an episcopal city of Italy, in the state of the church, seated on a mountain, in the duchy of Spoleto. E. Long. 13. 20. N. Lat. 42. 33.

AMELLUS, STARWORT, a genus of the polygamia superflua order, belonging to the syngenesia class of plants.—Of this there are two

Species. 1. The lynchitis, with one flower on each footstalk. This is a native of the Cape of Good Hope. It is a perennial plant, rising about three feet high, sending out many branches on each side, so as to form a bushy plant; the branches are garnished with obtuse spear-shaped leaves placed opposite, and are terminated by single naked flower-stalks, each supporting one vio-

let-coloured flower, having a yellow disk, which is succeeded by oblong seeds. 2. The umbellatus, with flowers growing in umbels, is a native of Jamaica; and rises from two to three feet high, sending out many branches clothed with opposite leaves, which are terminated by small flowers in umbels.

Culture. The first is easily propagated, either by cuttings planted in the summer-months, or by seeds sown on a moderate hot-bed in the spring, but the plants require a slight shelter in winter. The second is much more tender, and therefore requires to be preserved in a stove during the winter-season.

AMEN, in the scripture-language, a solemn formula, or conclusion to all prayer, signifying *so be it*. The term *amen* is Hebrew, being derived from the verb *aman*, i. e. to be true, faithful, &c. So that, strictly speaking, it signifies *truth*; and used adverbially, as is frequently done in the gospels, *truly* or *verily*. Sometimes it is repeated twice together, and then it stands for the superlative: as, *Amen, amen, dico vobis*; "*Verily, verily, I say unto you.*"

AMEND, or AMENDE, in the French customs, a pecuniary punishment imposed by a judge for any crime, false profecution, or groundless appeal.

AMENDE *Honorable*, an infamous kind of punishment inflicted in France upon traitors, parricides, or sacrilegious persons, in the following manner: The offender being delivered into the hands of the hangman, his shirt is stripped off, a rope put about his neck, and a taper in his hand; then he is led into court, where he must beg pardon of God, the king, the court, and his country. Sometimes the punishment ends here; but sometimes it is only a prelude to death, or banishment to the galleys.

AMENDE *Honourable* is a term also used for making recantation in open court, or in presence of the person injured.

AMENDMENT, in a general sense, denotes some alteration or change made in a thing for the better.

AMENDMENT, in law, the correction of an error committed in a process, which may be amended after judgment, unless the error lies in giving judgment; for in that case it is not amendable, but the party must bring a writ of error. A bill may be amended on the file at any time before the plea is pleaded; but not afterwards, without motion and leave of the court.

AMENDMENT of a *Bill*, in parliament, is some alteration made in the first draught of it.

AMENTUM, in botany, the name of a species of calix, consisting of valves, and hanging down in different directions from the calulis. Common oats afford a good example of the amentum.

AMENTUM, in Roman antiquity, a thong tied about the middle of a javelin or dart, and fastened to the fore-finger, in order to recover the weapon as soon as it was discharged. The ancients made great use of the amentum, thinking it helped to enforce the blow. It also denotes a latchet that bound their sandals.

AMERCEMENT, or AMERCIAMENT, in law, a pecuniary punishment imposed on offenders at the mercy of the court. It differs from a fine in being imposed arbitrarily in proportion to the fault; whereas a fine is a certain punishment settled expressly by some statute.

AMERICA, (from *Americus Vesputius*, falsely said to

Amen
||
America.

America. to be the first discoverer of the continent); one of the four quarters of the world, probably the largest of the whole, and, from its late discovery, frequently denominated the *New World*.

boundaries. This vast country is bounded, on the east, by the Atlantic ocean, which separates it from Europe and Africa; on the west, by the Pacific ocean, or great South sea, by which it is separated from Asia. On the fourth, it is bounded by the Frozen ocean. But its boundaries towards the north have never been ascertained; nor is it known whether the northern parts of America join to those of Europe and Asia or not. As far as it is known, America extends from Lat. 80° N. to 56° S. and from 35° to 136° Long. W. from London; its length being between 8000 and 9000 miles, and its greatest breadth 3690.

2. America is by no means of equal breadth throughout its whole extent; but is divided into two great continents, called *North* and *South America*, by an Isthmus 1500 miles long, and which at Darien, about Lat. 9° N. is only 60 miles over. This isthmus forms, with the northern and southern continents, a vast gulph, in which lie a great number of islands, called the *West Indies*, in contradistinction to the eastern parts of Asia, which are called the *East Indies*.

3. Between the New World and the Old, there are several very striking differences; but the most remarkable is the general predominance of cold throughout the whole extent of America. Though we cannot, in any country, determine the precise degree of heat, merely by the distance from the equator; because the elevation above the sea, the nature of the soil, &c. affect the climate; yet, in the ancient continent, the heat is much more in proportion to the vicinity to the equator, than in any part of America. Here the rigour of the frigid zone extends over half that which should be temperate by its position. Even in those latitudes where the winter is scarcely felt on the old continent, it reigns with great severity in America, tho' during a short period. Nor does this cold, prevalent in the New world, confine itself to the temperate zones; but extends its influence to the torrid zone also, considerably mitigating the excess of its heat.—Along the eastern coast, the climate, tho' more similar to that of the torrid zone in other parts of the earth, is nevertheless considerably milder than in those countries of Asia and Africa which lie in the same latitude. From the southern tropic, to the extremity of the American continent, the cold is said to be much greater than in parallel northern latitudes even of America itself.

For this so remarkable difference between the climate of the New continent and the Old, various causes have been assigned by different authors. The following is the opinion of the learned Dr Robertson on this subject. "Though the utmost extent of America towards the north be not yet discovered, we know that it advances nearer to the pole than either Europe or Asia. The latter have large seas to the north, which are open during part of the year; and, even when covered with ice, the wind that blows over them is less intensely cold than that which blows over land in the same latitudes. But, in America, the land stretches from the river St Lawrence towards the pole, and spreads out immensely to the west. A chain of enormous mountains, covered with snow and ice, runs through all this

dreary region. The wind passing over such an extent of high and frozen land, becomes so impregnated with cold, that it acquires a piercing keenness, which it retains in its progress through warmer climates; and is not entirely mitigated until it reach the Gulph of Mexico. Over all the continent of North America, a north-westerly wind and excessive cold, are synonymous terms. Even in the most sultry weather, the moment that the wind veers to that quarter, its penetrating influence is felt in a transition from heat to cold, no less violent than sudden. To this powerful cause we may ascribe the extraordinary dominion of cold, and its violent inroads into the southern provinces in that part of the globe.

"Other causes, no less remarkable, diminish the active power of heat in those parts of the American continent which lie between the tropics. In all that portion of the globe, the wind blows in an invariable direction from east to west. As this wind holds its course across the ancient continent, it arrives at the countries which stretch along the western shore of Africa, inflamed with all the fiery particles which it hath collected from the sultry plains of Asia, and the burning sands in the African deserts. The coast of Africa is, accordingly, the region of the earth which feels the most fervent heat, and is exposed to the unmitigated ardour of the torrid zone. But this same wind, which brings such an accession of warmth to the countries lying between the river of Senegal and Caffaria, traverses the Atlantic ocean before it reaches the American shore. It is cooled in its passage over this vast body of water; and is felt as a refreshing gale along the coasts of Brazil and Guiana, rendering those countries, tho' amongst the warmest in America, temperate, when compared with those which lie opposite to them in Africa. As this wind advances in its course across America, it meets with immense plains, covered with impenetrable forests; or occupied by large rivers, marshes, and stagnating waters, where it can recover no considerable degree of heat. At length it arrives at the Andes, which run from north to south thro' the whole continent. In passing over their elevated and frozen summits, it is so thoroughly cooled, that the greater part of the countries beyond them hardly feel the ardour to which they seem exposed by their situation. In the other provinces of America, from Terra Firma westward, to the Mexican empire, the heat of the climate is tempered, in some places, by the elevation of the land above the sea; in others, by their extraordinary humidity; and in all, by the enormous mountains scattered over this tract. The islands of America in the torrid zone are either small or mountainous, and are fanned alternately by refreshing sea and land breezes.

"The causes of the extraordinary cold towards the southern limits of America, and in the seas beyond it, cannot be ascertained in a manner equally satisfying. It was long supposed, that a vast continent, distinguished by the name of *Terra Australis Incognita*, lay between the southern extremity of America and the antarctic pole. The same principles which account for the extraordinary degree of cold in the northern regions of America, were employed in order to explain that which is felt at Cape Horn and the adjacent countries. The immense extent of the southern continent, and the rivers which it poured into the ocean, were mentioned

America.

4. north and south continents.

5. remarkable prevalence of cold.

Dr Robertson's reasons for this superior degree of cold. History of Amer. vol. I. p. 253.

America.

and admitted by philosophers as causes sufficient to occasion the unusual sensation of cold, and the still more uncommon appearances of frozen seas in that region of the globe. But the imaginary continent to which such influence was ascribed having been searched for in vain, and the space which it was supposed to occupy having been found to be an open sea; new conjectures must be formed with respect to the causes of a temperature of climate, so extremely different from that which we experience in countries removed at the same distance from the opposite pole.

^{Thid. p. 457.}
^{note NXXI.}

"The most obvious and probable cause of this superior degree of cold, towards the southern extremity of America, seems to be the form of the continent there. Its breadth gradually decreases as it stretches from St Antonio southwards, and from the bay of St Julian to the straits of Magellan its dimensions are much contracted. On the east and west sides, it is washed by the Atlantic and Pacific oceans. From its southern point, it is probable, that an open sea stretches to the antarctic pole. In which ever of these directions the wind blows, it is cooled before it approaches the Magellanic regions, by passing over a vast body of water; nor is the land there of such extent, that it can recover any considerable degree of heat in its progress over it. These circumstances concur in rendering the temperature of the air in this district of America, more similar to that of an insular, than to that of a continental climate; and hinder it from acquiring the same degree of summer-heat, with places in Europe and Asia, in a corresponding northern latitude. The north wind is the only one that reaches this part of America, after blowing over a great continent. But, from an attentive survey of its position, this will be found to have a tendency rather to diminish than augment the degree of heat. The southern extremity of America, is properly the termination of the immense ridge of the Andes, which stretches nearly in a direct line from north to south, through the whole extent of the continent. The most sultry regions in South America, Guiana, Brazil, Paraguay, and Tucuman, lie many degrees to the east of the Magellanic regions. The level country of Peru, which enjoys the tropical heats, is situated considerably to the west of them. The north wind, then, though it blows over land, does not bring to the southern extremity of America an increase of heat collected in its passage over torrid regions; but, before it arrives there, it must have swept along the summit of the Andes, and come impregnated with the cold of that frozen region."

⁸
^{These reasons insufficient.}

Was the southern part of America only moderately cool, no doubt the above reasons would be entirely satisfactory; but it must be remembered, that the cold at the southern extremity of America is not only much greater than in those parts of Europe or Asia lying under equal parallels of north latitude, but even the places in North America itself which lie in the same latitudes. We must even observe, with all due deference to the abilities of our learned and eloquent historian, that the reasons he gives, as a philosopher, for the extreme cold in North and South America, contain a direct contradiction.—The wind which blows over frozen land, he tells us, p. 253. is colder than that which blows over frozen sea. This of itself is somewhat problematical; however, we shall accept of it without dispute. North America, then, is

colder than Europe or Asia, because the continent is larger than the northern parts of Europe and Asia put together. This hath never been proved, and is not far from being incredible; but still we shall not dispute. North America is excessively cold because it is a *large* continent; but why is South America still colder?—Because it is a *small* one.

We are now led into a discussion of the philosophical question concerning the reason why cold predominates more in large continents than in islands; and if we determine this question in the common way, namely, that the vicinity of the sea keeps the cold from becoming so violent in the latter as in the former, it is plain, we shall then run into the same difficulty which we have just now observed Dr Robertson unsuccessfully endeavouring to solve. It will be proper, however, before entering upon either of these questions, to consider the general causes by which different degrees of heat are produced in different parts of the world; and then to examine the state of facts with regard to the different degrees of cold in North and South America.

Though the sun is the prime agent in nature by which every degree of sensible heat is produced, and to the presence or absence of his rays heat and cold are to be ultimately ascribed; yet so many circumstances concur in augmenting or diminishing the effect of his light, that some philosophers have not scrupled to assert, that this luminary does not *produce* heat, but only *regulate* that which is produced from other causes *.

* See Heat.

The determination of this question we reckon to be of no importance at present; for if the sun *produces* heat, why does he not produce it equally in countries equally exposed to his action? If he only *regulates* it, why does he not regulate the heat equally in similar parallels of northern or southern latitude? Whether, therefore, we allow the sun to be the original fountain, or only the regulator of heat, we must own that there are certain circumstances peculiar to different countries, which tend very much to supercede his action.

It is certain that there are some kinds of bodies of such a nature, that, though they are exposed to equal degrees of heat, one of them will become much hotter to the touch than the other, in the same time. All solid bodies will become hot much sooner than water, and will be also sooner susceptible of a violent degree of cold. Earth is therefore always disposed to be sooner affected than water by the influence of the sun's rays; and consequently to become much hotter in summer, as well as more violently cold in winter, than that element. The great quantity of moisture with which the earth is always impregnated, can be no objection to the truth of this observation: for it is certain, that moist earth will be affected by frost much sooner than an equal surface of water; and it is a well known fact, that water can by no means be made to evaporate by heat so fast as when it is mixed with earth, or some other solid substance in powder, so as to form a kind of paste; provided that paste is not suffered to harden in such a manner as to detain the aqueous moisture in the middle of it.

This single principle, therefore, namely, that water is less susceptible of heat than earth, will in a great measure determine what must be the difference of climate between a large tract of land, and an equal one of sea.—In summer, the land, being exposed to the sun's rays acting more powerfully than at other times, must

necessarily

America.

⁶
Discussion of the question why continents are colder than islands.

⁷
Some bodies more susceptible of heat than others.

⁸
The summer necessarily very hot in continents.

America. necessarily acquire a great degree of heat, as long as their operation continues with much force. But as solid bodies are apt to part readily with their heat, the superfluous quantity will be daily discharged into the atmosphere; and the earth will have lost so much heat during the night, as will enable it to receive a fresh quantity next day without injury to plants or animals. In consequence of this, the air will gradually come to be very hot; and if there was not some cause whereby this continual increase of heat is limited, it might certainly become intolerable.

Where there is a vast tract of sea, the case must be widely different. Water is an element in itself not so easily heated as earth. By reason of its fluidity, also, the heat will penetrate deeper into it than into the earth; hence, in the course of one summer, equal tracts of land and sea will be very unequally heated. The warmth of the latter will be much less, but it will extend much deeper, and will be more durable; and having less heat to communicate to the atmosphere than earth, the climate, even in summer, must be much colder than on an equal tract of land.—On the approach of winter, the atmosphere is first cooled by reason of its wanting the usual influence of the sun's rays. The surface of the earth then communicates part of its heat to the air, which absorbs it with avidity; but, as the heat could not penetrate far into the earth, neither can the cold, and consequently the dry land is exposed to the action of heat or cold only for a small space downwards.—In water, the case is different: that element becomes specifically heavier by cold: in consequence of which, its uppermost surface is no sooner cooled, ever so little beyond that which lies immediately below, than it sinks down, and presents a new surface to the action of the air; and, it is plain, that this must be repeated, till the whole body of water is reduced to the same temperature. In the instant of freezing, water discharges a great quantity of heat, as has been observed by Dr Black and others *. This affords a new supply to the atmosphere; so that all the time water is freezing, the cold of the atmosphere will be considerably moderated by the heat discharged from the newly formed ice. When the ice is once formed, indeed, the atmosphere still continues to act upon it, and to cool it still more; but as it is now a solid body, this action will be confined to its surface, the under parts remaining pretty much inactive either as to the production of heat or cold beyond the freezing point.

On the return of summer, the ice, which has been formed during the winter, will require as much heat merely to melt it, as would be sufficient to heat a solid body of an equal bulk almost to 175° of Fahrenheit, as Dr Black's experiments have undeniably proved †; and tho' the snow and ice on land will require the same degree of heat to melt them as on sea, yet their quantity at land must always be much less than at sea, because of the small quantity of water on the land.—When the snow, with which the ground was covered, is totally melted, the sun has then liberty to act upon the ground itself, and will heat it accordingly. Thus, on account of the much greater quantity of ice on sea than on land, a great part of the summer will be spent before the water can be reduced to a temperature barely above the freezing point; while the land will have received as much heat as to communicate a very

considerable degree to the atmosphere.

From what we have just now said, it must be easy to discover, what will be the difference between the corresponding seasons on sea and on land.—On sea, where there is much ice, the heat of the summer is in a manner totally absorbed in a latent state*, so as scarcely to be perceived. In winter, the extreme cold is moderated by the emission of the latent heat formerly absorbed on the melting of the ice, but now again discharged on its second freezing. The whole year, therefore, on a large tract of sea, will be in a manner one continued winter. On a continent, as the land does not absorb much heat, the greatest part will be reverberated into the atmosphere, so that the summer must be extremely hot; and, in winter, as the ground has not absorbed much heat, so it can communicate little to moderate the cold, which, of consequence, will be excessive.—We may conclude, therefore, that, in a large continent, the winter will be excessively cold, and the summer excessively hot; but, on the ocean, or in islands at a considerable distance from the continent, the summer will neither be so hot nor the winter so cold as in the corresponding places on the continent; and if the heat of summer is not sufficient to thaw the ice collected during the winter, there must be afterwards a perpetual absence of summer without any violent degree of winter.

What we have here advanced is supported by the testimonies of all respectable authors who have treated of the different degrees of heat found in different parts of the world.—In Lapland, the most northerly part of the continent of Europe, the winters are so severe, that it is not unusual for people's lips to be frozen to the cup while they are attempting to drink, the limbs of the inhabitants very often mortify with cold, and the ground is covered with snow to the depth of several feet; but, in summer, the heat is excessive for a short time. The heats of summer in Norway, also, are very great, according to the bishop of Pontoppidan's account. The same thing is likewise related of Sweden, where, though the winter is extremely severe, the summer's heat is said to be so great as sometimes to set forests on fire; but this is undoubtedly an exaggeration. Certain it is, however, that in these northern countries, where the summer is very short, it must be proportionally hotter than in this country, otherwise no kind of grain could be brought to perfection. In Siberia, the winter cold is excessive beyond what in this country we can have any notion of: and it may be well supposed to be so; as being environed by land on all sides except the north, where it is probably bounded by the frozen ocean. According to some observations communicated to the Royal Academy of Sciences by M. de Lifle of Peterburg, the mercury in Fahrenheit's thermometer, in the winter 1737, fell to 118° below 0; and this at Kirenga, a place lying only in N. Lat. 58° 10', scarce so far to the northward as the shire of Caithness in Scotland. Yet even in Siberia, much farther north, within the arctic circle itself, we find several towns marked on our maps; and were not such excessive cold balanced in some degree by a warm summer, it is utterly impossible that human creatures could support the climate. At Peterburg, lying in Lat. 60°, the cold was lately so intense, as to sink the thermometer 40° below 0, when the remarkable experiment concerning the freezing of quicksilver was tried*: but even

America.

12
Conclusion.

* See Congelation.

13
Supported by the testimonies of different authors.

* See Congelation.
this

9
cool on the
can.

10
Winter on
the continents
very
cold:

11
on the ocean,
cool.

See Cold,
Congelation,
and Evaporation.

See Congelation.

America.

this extreme cold was far short of that just now mentioned at Kirenga; probably owing to the latter being more to the eastward, and farther in the continent, than Petersburg. The cold at Kirenga was only 22° below what is sufficient to freeze quicksilver, as Dr Black hath rendered very probable; and in some places of Siberia, lying near the polar circle, it is not improbable that mercury might freeze naturally without the help of artificial cold.

14
North American winters not so cold as those of Asia.

Though the climate of North America certainly appears colder to those who have visited it, than the corresponding places of Europe, yet we have no proof that the colds in that part of the world are absolutely superior to those on the eastern continent; indeed we cannot well suppose any degree of cold superior to what we have already mentioned. At Albany-*fort*, on Hudson's-bay, situated in Lat. 53°. 20'. N. the thermometer in winter 1775 stood at 28° below 0. This was certainly very great, but far inferior to the above-mentioned Siberian cold in Lat. 58° 10'; and it cannot be thought, that the small difference in latitude would occasion such an enormous difference in the degree of cold.

In a strict sense, then, we must allow the climate of North America to be warmer than that of the eastern continent; for no experiments made with the thermometer have hitherto shewn such a degree of cold to exist in North America as in Asia. It is colder, however, in this respect, that the winter is, as it were, mixed with the summer; and this undoubtedly is owing to the continent being *smaller*, not larger as Dr Robertson asserts, than Europe and Asia put together.—It is certain, that where any country is so situated that great part of it is covered with snow throughout the whole year, those places which lie near the snowy regions will be fenible of winter even in the midst of summer. From the principles already laid down, if the summer heat is insufficient to melt the snow, the air will continue almost as cold in summer as in winter, because whatever quantity of heat is sent forth by the sun, it is all absorbed and in a latent state.—Here we cannot help remarking, that, notwithstanding the learned Doctor's assertion, it is utterly impossible that a tract of land covered with snow, and a tract of sea covered with snow, can affect the temperature of the atmosphere differently. The reason is plain; because it is only the snow or ice, and neither the land below it nor the sea below it, that affects the atmosphere. The vicinity of a tract of land covered with snow, or a tract of sea covered with snow, must therefore prodigiously affect the summer of countries adjacent to them, and will undoubtedly produce chilling blasts as often as the wind blows from that quarter; and this is the case with North America, as already mentioned.

The reason why such large tracts in North America are constantly covered with snow, is probably the prodigious number and size of its mountains, greatly exceeding what are to be found on the eastern continent. The tops of high mountains are always excessively cold, even in the warmest regions; and they necessarily keep off the warmth of the sun in summer from large tracts of ground. For this reason, they naturally produce cold summers; but they also afford shelter to the trees and other vegetables in winter; so that wood is found in America much farther north than in Asia. This,

which is a very strong proof of the greater cold of the Asiatic winters than the North American, will appear from the following account * of the climate of North America, contrasted with that of the eastern coast of Asia.

America.

* Dume-
resque's trans-
lation of
Kraffen-
coff's account
of Kamchat-
ka.

"The American land is in a much better state, with regard to climate, than the farthestmost eastern part of Asia, though it lies near the sea, and has every where high mountains, some of which are covered with perpetual snows; for that country, when its qualities are compared with those of Asia, has by far the advantage. The mountains of that part of Asia are every where ruinous and cleft; from whence they have, long since, lost their consistency, and likewise their inward warmth; upon which account, they have no good metal of any kind; no wood nor herbs grow there, except in the valleys, where is seen small brush-wood and stiff herbs. On the contrary, the mountains of America are firm, and covered on the surface, not with moss, but with fruitful earth or mold; and therefore, from the foot to the very top, they are decked with thick and very fine trees. At the foot of them, grow herbs proper to dry places, and not to marshy ones; besides that, for the most part, those plants are of the same largeness and appearance both on the lower grounds and on the very tops of the mountains, by reason that there is every where the same inward heat and moisture. But, in Asia, there is so great a difference between them, that of one kind of plants growing there, one would be apt to make several kinds, if one did not observe a rule, which holds generally with regard to those places, *viz.* That, in lower grounds, herbs grow twice as large as on the mountains.

15
North American climate contrasted with that of Asia.

"In America, even the sea-shores, at 60° latitude, are woody; but in Kamchatka, at 51° lat. no place set with small willows and alder-trees is found nearer than 20 versts from the sea: plantations or woods of birch-trees are, for the most part, at the distance of 30 versts; and with regard to pitch-trees, on the river Kamchatka, they are at the distance of 50 versts, or more, from its mouth. At 62°, there is no wood at Kamchatka.

"In Steller's opinion, from the aforementioned latitude of America, the land extends as far as 70°, and farther; and the chief cause of the aforesaid growth of woods in that country, is the cover and shelter it has from the west. On the other hand, the want of wood on the Kamchatkalian shores, especially on the shore of the Peninsular sea, doubtless comes from a sharp north wind, to which it is much exposed. That those parts which lie from the Lopatka, farther to the north, are more woody and fruitful, is owing to cape Tehukotki, and the land that has been observed over against it, by which those parts are sheltered from the sharp winds.

"For this reason, also, fish come up the rivers of America earlier than those of Kamchatka. The 20th of July, there has been observed a great plenty of fish in those rivers; whilst at Kamchatka, it is then but the beginning of an abundant fishery."

In the southern hemisphere the water bears a much larger proportion to the land than in the northern. From the chart prefixed to Mr Forster's account of Cap^t Cook's voyages in 1772, 1773, 1774, and 1775, it appears, that the whole space contained between the south pole, and 30° of lat. all round the globe, is entirely occupied

America.

16
Perpetual
inter in
the southern
climates.

plied by the ocean, except a small part of South America, a still smaller part of Africa, the islands of New Zealand, and a very inconsiderable portion of New Holland. Here, according to what we have advanced, a perpetual winter ought to take place; and for a great part of the space it actually does so. In 1766, Oct. 30th, Commodore Byron, while in lat. 35. 50 S. found the weather as cold as in the same month in England. In 1766, Nov. 12. Captain Wallis found it very cold in Lat. 30° S. though the month of November in that climate corresponds to that of May with us.—In 1769, January 3. Captain Cook's people complained of cold in lat. 47. 17. S. and were clothed in their winter-garments; though this was the month which corresponds to July with us, and consequently the warmest in the whole year: nay, on the 16th of this month, Dr Banks and Dr Solander having gone ashore on Tierra del Fuego, lying in a south latitude corresponding to that of England, they were overtaken by a violent storm of snow, and the cold was so excessive as to kill two of their attendants. In 1770, March 18th, corresponding to the same day of September with us, the whole country of New-Zealand, in lat. 43. 4. S. was covered with snow. In November 1772, Captain Cook's people put on their winter-dress in lat. 42° S. and on December 5th, corresponding to the same day of June in this country, the thermometer sunk to 38° during the night; and some snow fell next morning. Five days after, having advanced as far as lat. 49. 45. S. the thermometer sunk to 32°, and fresh water began to freeze aboard their ship. The next morning, they fell in with ice floating on the sea. Proceeding still to the southward, they were stopped in lat. 67. 15. S. by field ice, such as is met with in the high northern latitudes, only much thicker.

When they had once fallen in with the ice, it does not appear that the cold had greatly increased: for though they afterwards proceeded as far as 71° 10'. S. the weather was far from being intolerable; for at that latitude, on January 30th 1774, the thermometer stood only at 32°.

We shall conclude this subject with some observations made by Mr Forster, on the climate of different places in the southern hemisphere. The following is an account of the climate of New Zealand in Nov^r. 1773.—“ Scarcely a day passed without heavy squalls of wind, which hurried down with redoubled velocity from the mountains; and strong showers of rain, which retarded all our occupations. The air commonly was cold and raw, vegetation made slow advances, and the birds were only found in the valleys sheltered from the chilling southern blast. This kind of weather, in all likelihood, prevails throughout the winter; and likewise, far into the middle of summer, without a much greater degree of cold in the former, or of warmth in the latter season. Islands far from any continent, or at least not situated near a cold one, seem in general to have an uniform temperature of air; owing, perhaps, to the ocean which every where surrounds them. It appears from the meteorological journals kept at Port Egmont, on the Falkland Islands; that the extremes of the greatest cold and the greatest heat observed there throughout the year, do not exceed 30° on Fahrenheit's scale. The latitude of that port is 51. 25. S. and that of Ship-cove, in Queen Charlotte's sound, only 41. 5. This consider-

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able difference of site, will naturally make the climate infinitely milder than that of Falkland's Islands, but cannot affect the general hypothesis concerning the temperature of all islands; and the immense height of the mountains in New Zealand, some of which are covered with snow throughout the year, doubtless contributes to refrigerate the air, so as to assimilate it to that of the Falkland's Isles, which are not so high.”

Tierra del Fuego, the southern extremity of America, is thus described. “ On the 2^d of December 1774, after a short calm, we had a fresh breeze, which continued to blow without intermission, but with different degrees of velocity, till the 18th, when we made the land, a little after midnight, near Cape Defeado, on one of the westernmost islands of Tierra del Fuego. The part of the world which was now in sight, had a very unfavourable aspect. About 3 o'clock in the morning, we ran along it, and found it for the greatest part hid in a thick haze. The parts near us seemed to be small islands, which, though not very high, were, however, very black, and almost entirely barren. Beyond them we saw some broken high lands, which were covered with snow, almost to the water's edge.—In the afternoon, we passed the island upon which Cape Noir is situated, mentioned by M. Frezier.—We found many separate islands, from the place where we made the coast, to Cape Noir; and should perhaps have seen many more, if the weather had not been very hazy.

“ We found the land to all appearance much more compact after passing Cape Noir; and the next morning, December 19th, in particular, the coast seemed to be entirely connected; the mountains rose to a much greater height, immediately from the sea-side, and were covered with snow in every part. The wind gradually lessened, and towards noon we were entirely becalmed, having the finest sunshine and mild weather.—It was very amusing to us to meet with mild weather in the neighbourhood of that tempestuous cape, of which the name alone has afflicted the mariners ever since Lord Anson's voyage. The destruction of vulgar prejudices is of so much service to science, and to mankind in general, that it cannot fail of giving pleasure to every one sensible of its benefits. We had this day the thermometer at 48°; which, considering the neighbourhood of the huge heaps of snow on shore, was very moderate. This part of the world has been called the *Coast of Deposition* by the navigators who first visited it, and seems fully to deserve the appellation. Here we discovered nothing but vast mountains, of which the spiry summits were every where covered with eternal snow. Along the sea, the nearest rocks were clear of snow; but black, and destitute of grasses and shrubbery. Some inlets appeared in different parts, where a few islands seemed to have a covering of green. We stood in to one of these in the evening, having obtained an easterly breeze. A huge perpendicular wall of rock formed its western entrance, and Captain Cook called it the *York Minster*; having discovered a strong resemblance between that Gothic building, and this dreary chaotic rock. It lies in 55. 30. S. and 70. 28. W. Along the coast we found regular foundings; but, in the mouth of the inlet, we could not reach the bottom with 150 fathom of line. This circumstance had already happened to us before, at Dusky Bay (New-Zealand); but, as we saw a very spacious bay before us,

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we ventured to stand on, amidst different rude islands; on which the summits of the hills were sometimes capped with snow.—After being much retarded by calms, we arrived about 9 o'clock in a small cove, indifferently sheltered either from wind or sea, but a welcome place of refuge on account of the approach of night.

“The next morning Captain Cook, &c. went in a boat in quest of a more safe and convenient anchorage. We only rowed round a single point of the island under which our ship lay, and immediately found a fine cove sheltered from all winds, and perfectly land-locked, with a little rill of water, and a shrubbery. The weather was mild, considering the climate; and several birds were heard on shore. We found many little clefts, which cannot properly be called valleys, where a few shrubs of different species sprung up in a thin layer of swampy soil, being defended against the violence of storms, and exposed to the genial influence of reverberated sunbeams. The rock, of which the whole island consisted, is a coarse granite, composed of feld-spath, quartz, and black mica or glimmer. This rock is in most places entirely naked, without the smallest vegetable particle; but wherever the rains or melted snows have washed together some little rubbish, and other particles in decay, it is covered with a coating of minute plants, in growth like mosses, which forming a kind of turf about an inch or more in thickness, very easily slip away under the foot, having no firm hold on the rock. In sheltered places, a few other plants thrive among these mossy species, and these at last form a sufficient quantity of soil for the nutriment of shrubs, especially in such spots as I have mentioned before.—Bare as these rocks appeared, yet almost every plant we gathered on them was new to us; and some species were remarkable for the beauty of their flowers, or their smell.

“Early the next morning, Captain Cook set out to take bearings in the found, and we took that opportunity to examine its natural productions. The found is very spacious, and surrounded to the north and east by several ranges of high mountains, which seem covered with permanent snow and ice.—On entering this found, and taking notice of its dreary desolate appearance, we had supposed that the natives of Tierra del Fuego never touch upon this inhospitable part, but confine themselves to the neighbourhood of the straits of Magalhaens, and to the eastern side of Tierra del Fuego; but it seems that human nature is capable of withstanding the greatest inclemencies of weather, and of supporting its existence alike in the burning sands of Africa, and in the frozen extremities of the globe. We landed on several other islands, from whence we had a most extensive prospect across the found, which looked wild and horrid in its wintry dress. This was, however, the first summer month of these regions; most of the plants we saw were in flower, and the birds were every where bringing up their young. From thence we may easily form an adequate idea of the torpid state of these regions, where the sun-beams cannot melt the snow, at a season when their influence is the strongest. The farther we advanced from the sea, the more snow appeared on the mountains. In some places, we saw cascades, and streams, gushing down over the snow, especially where the rays of the sun took effect by being frequently reflected. We found a most beautiful cove on this coast, which formed a circular basin, where the

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water was smooth and transparent as a mirror. All the lower parts were fringed with trees, which we had no where seen so tall in the neighbourhood, and many streams gushed down with great impetuosity between their roots, making a most convenient watering place. A prodigious number of small birds sat on every branch, and twittered around us in the sun-shine. They were of many different species; but, unacquainted with men—hopped so near us, that it was impossible to shoot them, especially as we had no other than coarse shot left, and that in very small quantity. Abundance of mosses, ferns, and climbers, grew up between the trees, and were no small impediment to us in walking. Various flowers enlivened these woods, and increased our collection with new species. Here, then, there was the appearance of summer; but if we looked up to the monstrous cloud-capt mountains which formed almost perpendicular walls on all sides of the harbour, and beheld them covered with snow and ice, which had sometimes a blue, and sometimes a yellowish tinge, we thought ourselves transported to the Glaciers of Switzerland, where the seasons seem likewise to be lost and confounded in each other. The height of these mountains was very considerable, tho' not equal to the Alps; and their summits were divided into many sharp and craggy points, between which the interval was filled with snow. We landed here; and walked along the shore to another port, formed by a number of low islands, which entirely sheltered it from all winds.—We were fortunate enough to meet with an island entirely covered with the shrubs of a species of arbutus, loaded with red fruit, of the size of small cherries, which were very well tasted, and combined an agreeable tartness with a sweet and a bitter flavour. The rocks of the same island, at the water's edge, were covered with large muscle-shells, of which we found the fish more delicious than oysters.—To add to our good fortune, we met with several islands on our return, covered with excellent celery, which, tho' much smaller than that of New Zealand, was much higher flavoured, its juices being probably more concentrated. We loaded our boat with it, and returned late on board, after being overtaken by several smart showers. On our return, we found that the neighbourhood of the ship was very sensibly warmer than the northern parts of the found, where the air was refrigerated by the abundance of snow on the mountains.—

December 25th. “During our absence, some of the natives, in four small canoes, had visited the ship: they were described to us as wretched and poor; but inoffensive, and ready to part with their spears, seal-skins, and the like. We now regretted that we had lost the opportunity of seeing them; but fortunately they returned the next morning, tho' the weather was rainy. The four canoes in which they came were made of the bark of trees, which could hardly have grown in this found, on account of their size. Several small sticks are the ribs which defend this bark, and another stick forms the gunwale, over which they have wrapped the extremity of the bark and sewed it on. A few stones, with a small quantity of earth, are laid in the bottom of each canoe, and on this the natives keep a constant fire. Their paddles are small, and rudely formed; and they work very slowly with them. Each canoe contained from five to eight persons, including children, who,

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contrary to the custom of all the nations in the south sea, were very silent in their approach to the ship, and when aboard hardly pronounced any other word than *Pefferay*. Those whom M. Bougainville saw in the Strait of Magalhaens, not far from hence, used the same word, from whence he gave them the general name of *Pecherai*. We beckoned to them to come into the ship; and some accepted the invitation, tho' without the least sign of being pleased, and seemingly without the smallest degree of curiosity. Their persons were short, not exceeding five feet six inches at most, their heads large, the face broad, the cheek-bones very prominent, and the nose very flat. They had little brown eyes without life; their hair was black and lank, hanging about their heads in disorder, and besmeared with train-oil. On the chin they had a few straggling short hairs instead of a beard, and from their nose there was a constant discharge of mucus into their ugly open mouth. The whole assemblage of their features formed the most loathsome picture of misery and wretchedness to which human nature can possibly be reduced.—The shoulders and chest were broad and bony; but the rest of the figure was so lean and shrivelled, that to have seen it separate, we could not have believed that it belonged to the same person. Their legs were lean and bowed, and their knees disproportionately large. They had no other clothing than a small piece of old seal-skin, which hung from their shoulders to the middle of the back, being fastened round the neck with a string. The rest of their body was perfectly naked, not the least regard being paid to what Europeans would term decency. Their natural colour appeared to be an olive-brown, with a kind of gloss, which has really some resemblance to that of copper; but many of them had disfigured themselves with streaks of red paint, and sometimes, tho' seldom, with white.—The women were nearly formed as the men, though somewhat less in stature; their features were not less uncouth and ugly, and their dress exactly the same. They had only added a small piece of seal-skin, not so large as the palm of the hand, which hung down before, fixed to a string which was tied about the waist. Round their necks they wore leather strings, on which they had hung a number of shells; and on their heads they had a kind of bonnet, consisting of a few white quill-feathers of geese, which they occasionally placed upright on the head, by that means giving them a resemblance to the French head-dresses of the last century. There was but one single person among them, who had a small piece of a guanaco's skin sewed on his seal-skin, to lengthen it. The children were perfectly naked; and, like their mothers, huddled continually about the fire, in each canoe, shivering continually with cold, and rarely uttering any other word than *Pefferay*, which sometimes sounded like a word of endearment, and sometimes seemed to be the expression of complaint. Those of the men who had come on deck, spoke a few other words, which contained many consonants and gutturals, particularly the *h* of the Welsh; and all seemed to lip very strongly, which contributed to make them wholly unintelligible. They accepted trifles, such as beads, without seeming to value them; but, at the same time, they also gave away their own arms, or even their ragged seal-skins, without the least concern; their whole character being the strangest compound of stupidity,

indifference, and inactivity."

From this description of the country and inhabitants of Tierra del Fuego, we might reasonably enough conclude that no spot on earth can be in a more wretched state, unless it lies much nearer the south-pole; but had as this country is, it appears to profit considerably by the neighbourhood of the continent of South America; for small islands lying at a great distance from the continent, and nearly in the same latitude with Tierra del Fuego, are in a much worse state; as evidently appears from the description given by our author of South Georgia, and the southern Thule.

1774, January 16th.—"We had very cold weather all this time, the thermometer being at 34½, and great falls of snow covering our decks. This morning we had sight of the land again, and found its mountains of a vast height, covered with loads of snow and ice, in moist places down to the water's edge. The only parts which were clear of snow were a few black and barren cliffs, and particularly some huge hollow rocks, that

—o'er their wave-worn basis bowed. SHAKESPEARE.

"Towards the fourth end of this land we saw several low islands, like the New-year's islands, which appeared to have some verdure upon them, and were therefore called the *Green Islands*. As it had been the main object of our voyage to explore the high southern latitudes, my father suggested to Captain Cook, that it would be proper to name this land after the monarch who had set on foot our expedition, solely for the improvement of science, and whose name ought therefore to be celebrated in both hemispheres.—It was accordingly honoured with the name of *Southern Georgia*, which will give it importance, and continue to spread a lustre over it, which it cannot derive from its barrenness and dreary appearance.

"In the afternoon we saw two rocky islands at the north end of Georgia, which lay about a league asunder, and were of a dull black colour. We steered towards them, and about five o'clock passed in the middle between them. The northernmost was a craggy cliff, nearly perpendicular, which contained the nests of many thousand thags, and was named *Willis's Island*; it is situated in 54° S. and 38. 25. W. The southernmost sloped gradually to the westward, being covered on that side with some grass, and with innumerable flocks of birds of all sorts, from the largest albatrosses down to the least petrels; for which reason, it was named *Bird Island*. Great numbers of thags, penguins, divers, and other birds, played about, and settled in the water around us, this cold climate seeming to be perfectly agreeable to them. Several porpoises were likewise noticed, and many seals, which probably came to breed on these inhospitable shores.

"We ran along the north-east coast of the land, till it was dark, when we brought to, and did not resume our course till the next morning at three o'clock. The aspect of the land was extremely unpromising; the mountains were the most craggy we had ever seen, and formed many sharp points, between which the intervals were filled with snow. We passed a bay, which, from the numbers of low green islands in it, was named the *Bay of Islands*; and opened another towards which we stood with the ship, having foundings at the distance of two or three miles.—Upon advancing into the furthest reefs of the bay, we soon observed a solid mass of ice,

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South Georgia described.

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such as is found in the harbours of Spitzbergen (N. Lat. 79. 30.) This mass of ice bore a great resemblance to those detached islands of which we saw such numbers floating upon the ocean in the high southern latitudes. The shores of the bay nearer the sea were clear of snow, but excessively dreary, and almost perpendicular. We landed in a spot which was perfectly sheltered from the swell, and where the land formed a long projecting point. Here we saw a number of seals assembled on a stony beach; and among them a huge animal, which we had taken to be a rock at a distance, but which proved to be exactly the same animal with Lord Anson's sea-lion.—The seals which we found here, were more fierce than any we had seen on the New-year's Isles, and did not run out of our way. The youngest cubs barked at us; and ran after our heels when we passed by them, trying to bite our legs.—We climbed upon a little hummock, about eight yards high, where we found two species of plants; one was the grass which grows plentifully on the New-year's Isles (*dactylis glomerata*), and the other a kind of burnet (*sanguisorba*). Here Captain Cook displayed the British flag, and performed the ceremony of taking possession of these barren rocks, "in the name of his Britannic Majesty, and his heirs for ever." A volley of two or three musquets was fired into the air, to give greater weight to this assertion; and the barren rocks re-echoed with the sound, to the utter amazement of the seals and penguins, the inhabitants of these newly discovered dominions. The rocks consisted of a bluish grey slate, in horizontal strata, of which many fragments every where covered the beaches. As far as we were able to examine them, they contained no other minerals of any kind; the whole country being useless, and frightfully barren, in every respect. During our stay on shore, we saw some small fragments of ice floating out to sea, and heard the huge masses in the farthest part of the bay crack very loud from time to time. We continued to coast the land during the two following days, and discovered several bays and headlands upon it.—The appearance of the land was always nearly the same; its mountains towards the south were excessively high; and divided into innumerable ragged points, like the flames in a raging fire.—On the 19th, we reached the S. E. extremity of southern Georgia, which we now discovered to be an island, between 50 and 60 leagues in length.

"It has been supposed, that all parts of this globe, including those which are barren and dreary in the highest degree, are fit to become the abode of men. Before we arrived at this island of Georgia, we had nothing to oppose to this opinion, since even the wintry shores of Tierra del Fuego were inhabited by human beings, who were still one step removed from brutes. But the climate of Tierra del Fuego is mild with respect to that of Georgia, the difference in the thermometer which we observed being at least ten degrees. It has besides the advantage of producing a quantity of shrubbery and wood sufficient to supply the wants of the natives, who are by that means enabled to rest sheltered from the inclemencies of the air, and to light fires, which give them warmth, and may serve to make their food eatable and wholesome. As New Georgia is wholly destitute of wood, and of any other combustible to serve as a succedaneum, I apprehend it would

be impossible for any race of men to live upon it, though they should, instead of the stupidity of the Pellerais, be possessed of the ingenuity of the Europeans. The summers of this new island are rigorously cold, the thermometer having never risen ten degrees above the freezing point during our stay on the coast; and though we have reason to suppose, that the winters are not colder in the same proportion as in our hemisphere, yet it is probable there will be at least a difference of 20 or 30 degrees. This I think is sufficient to kill any men who may survive the summer there, supposing them provided with no other defence than that which the country affords. But South Georgia, besides being uninhabitable, does not appear to contain any single article for which it might be occasionally visited by European ships. Seals and sea-lions, of which the blubber is accounted an article of commerce, are much more numerous on the desert coasts of South America, the Falkland and the New-Year's islands, where they may likewise be obtained at a much smaller risk."

We can hardly expect an account of a country where winter prevails more perfectly than in New Georgia; yet even this island appears to have been greatly superior to that named the southern *Thule*, of which we have the following account.

"The discovery of this land happened on the 31st of January, at seven in the morning, when the weather was so hazy, that we could not see four or five miles around us. We ran towards it near an hour, when we were within half a mile of the rocks, which were black, cavernous, and perpendicular to a vast height, inhabited by flocks of flags, and beaten by dreadful breakers. Thick clouds veiled the upper parts of the mountains; but one immense peak appeared towering beyond them, covered with snow. It was agreed by all present, that the perpendicular height of this mountain could not be far short of two miles. We sounded with 170 fathoms close in shore; and then put about, standing to the south, in order to weather the western point, which we had now discovered. We had not run above an hour on this tack, when we saw high mountains to the S. S. E. about five or six leagues distant; which, from the course we had kept, we must have narrowly escaped about midnight. This being the southernmost extremity of the land, my father named it the *Southern Thule*, a name which Captain Cook has preferred. It is situated in 59. 30. S. and 27. 30. W.—Captain Cook, however, did not venture to lose any time in the investigation of this coast, where he was exposed to imminent danger from the violence of westerly winds. He chose rather to explore its northern extremities, which besides were doubtless the most likely to be of importance to navigators. We kept at the distance of two or three leagues from the land, having little winds, and seeing the coast every where steep and inaccessible. The mountains appeared to be of vast height, their summits being constantly wrapped in clouds, and the lower part covered with snow down to the water's edge, in such a manner, that we should have found it difficult to pronounce whether we saw land or ice, if some hollow rocks had not shewn their black and naked caverns in several places.

Feb. 1. "We found ourselves abreast of another projecting point in the morning, which Captain Cook has since named *Cape Montague*. Beyond it we discovered

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vered another point to the north, which, upon our nearer approach, was discovered to be a separate island, and named *Saunders's Island*. It was not inferior in height to the mountainous coast to the south of it, and was covered with snow and ice in the same manner. It is situated in 57. 48. S. and 26. 35. W.

"We had little wind during the night; but, with the return of day-light, flood to the eastward, in order to weather *Saunders's Island*.—We could not accomplish our point with a single board; but, the wind being contrary, tacked all the afternoon, in order to double the northern extremity of *Saunders's Island*. We came very near it several times, and observed a flat point or beach running out to the northward, covered with heaps of shingle, which were piled up in the wildest manner, and offered nothing but sharp points and ridges to the eye. The whole country had the most desolate and horrid appearance which can possibly be conceived; not a single grass could be discerned upon it, and it seemed to be forsaken even by the amphibious and lumpy animals which dwell on Southern Georgia. In short, we could not help applying to it that remarkable expression of Pliny,

Par mundi dammata a rerum natura, et densa merula caligine.
Hist. Nat. lib. xv. c. 36.

²³
Islands naturally colder than continents.

We have now abundant reason to conclude, that all islands are colder than continents lying in the same parallels of latitude; and that the vicinity of the ocean by no means contributes to produce warmth, but the contrary: and though water, by its property of absorbing heat in a latent state, and then discharging it in a sensible one, may be said to regulate the cold, so as to prevent its going to great extremes at any season; yet, by this very property, the distinction of seasons is lost, so that an island situated at a great distance from land may be uninhabitable by reason of the cold, while parts of a continent much nearer the pole than that island might furnish mankind with a comfortable abode.

²⁴
Coldness in America accounted for.

From its shape, America may almost be considered as consisting of two islands; for only a narrow isthmus prevents the southern continent from being entirely surrounded with water. These, though very large, are far from equalling the bulk of Europe, Asia, and Africa, put together. The southern continent is not so big as Africa, and it is doubtful whether Asia does not equal the bulk of both North and South America, especially if we take in the new-discovered island of New Holland, which is very little if at all inferior in bulk to Europe.—The three old continents are connected with one another, and are no doubt considerably warmer on that account. America is at a vast distance; and cannot profit by the warmth either of Africa or Asia, let it be ever so great. It is impossible, then, that the climate of New-York, New-England, and New-Scotland, can be so mild as that of France and Spain; because the winter in them is moderated by their having the Mediterranean sea to the south, and the Atlantic ocean to the west and north, at the same time that the vicinity of Africa prevents this vast quantity of water from absorbing much of their summer-heat. The American countries just now mentioned, have indeed the Atlantic Ocean on one side, but are surrounded with land on every other, nor have they any warm continent so near them as Asia and Africa are to the southern parts of Europe; and hence they are subject to

violent extremes of heat and cold; so that, in the streets of Boston, the capital of New-England, the ice frequently lies a foot thick, for several months in winter; while the summer-heats are very great. In like manner is South America colder than Africa, because of its inferiority in size, and its distance from any other continent; while the small islands in the southern ocean lying in latitudes corresponding to that of Britain, are utterly uninhabitable, and covered with perpetual snow and ice.

Another particularity in the climate of America is its excessive moisture in general. In some places, indeed, on the western coast, rain is not known; but, in all other parts, the moistness of the climate is as remarkable as the cold; and this moisture undoubtedly contributes to render America in general very unhealthy.—The forests wherewith it is every where covered, no doubt, partly occasion the moisture of its climate; but the most prevalent cause is the vast quantity of water in the Atlantic and Pacific Oceans with which America is invironed on all sides. Hence those places where the continent is narrowest are deluged with almost perpetual rains, accompanied with violent thunder and lightning, by which some of them, particularly Porto Bello, are rendered in a manner uninhabitable.

²⁵
Extreme moisture of the American climate.

This extreme moisture of the American climate is productive of much larger rivers there, than in any other part of the world. The Danube, the Nile, the Indus, or the Ganges, are not comparable to the Mississippi, the River St Lawrence, or that of the Amazons; nor are such large lakes to be found any where as those which North America affords.—To the same cause we are also partly to ascribe the excessive luxuriance of all kinds of vegetables in almost all parts of this country. In the southern provinces, where the moisture of the climate is aided by the warmth of the sun, the woods are almost impervious, and the surface of the ground is hid from the eye, under a thick covering of shrubs, herbs, and weeds.—In the northern provinces, the forests are not encumbered with the same luxuriance of vegetation; nevertheless, they afford trees much larger of their kind than what are to be found any where else.

²⁶
Large rivers, and excessive luxuriance of vegetation.

The same moisture which is so favourable to vegetation, is found to be very unfavourable to animal life. The brute creatures of America are generally of a small size when compared with those of Europe, Asia, or Africa; nay, those which have been imported by the Europeans, though they multiplied excessively, have never failed to degenerate in size, as well as in strength and vigour. We may with the more certainty ascribe this to the pernicious influence of the moisture, as it is observed, that black cattle brought from other parts of the continent to Porto Bello, where the moisture is exceedingly great, lose their flesh so fast, as to become in a few weeks scarce eatable.—To this, however, there is one exception; for America produces a species of ravenous birds called *condor*, superior both in size and strength to any that are to be found in other parts of the world.

²⁷
Moisture of the climate unfavourable to animals.

The same causes which check the growth and vigour of the more noble animals, are friendly to the propagation and increase of insects. Accordingly, these, especially such as delight in taking up their habitation in moist earth, are to be found in immense quantities throughout

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Produces vast numbers of insects.

America.

throughout the continent. At Porto Bello, toads are found in such multitudes that they hide the surface of the earth. At Guyaquil, snakes and vipers are hardly less numerous. It doth not appear, however, that serpents abound more, or even so much, in America, as in some places of Africa; for there, according to the accounts given by Mr Adanson, large plains are to be met with entirely covered with them. Nor have we any accounts of the locusts, which sometimes commit such devastations on the eastern continent, being ever found in America. Instead of these, they have a kind of ants, which, in some of the islands, have frequently consumed every vegetable production, and left the earth entirely bare, as if it had been burnt with fire. In Dec^r 1768, Captain Cook found the air at Rio Janeiro loaded with butterflies. They were chiefly of one sort; but in such numbers, that thousands might be seen in every direction, and the most of them flew above the mast head.

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Account of
the natives.

At the time America was discovered, it was found inhabited by a race of men no less different from those in the other parts of the world, than the climate and natural productions of this continent are different from those of Europe, Asia, or Africa.—One great peculiarity in the native Americans is their colour, and the identity of it throughout the whole extent of the continent. In Europe and Asia, the people who inhabit the northern countries are of a fairer complexion than those who dwell more to the southward. In the torrid zone, both in Africa and Asia, the natives are entirely black, or the next thing to it. This, however, must be understood with some limitation. The people of Lapland, who inhabit the most northerly part of Europe, are by no means so fair as the inhabitants of Britain; nor are the Tartars so fair as the inhabitants of Europe, who lie under the same parallels of latitude. Nevertheless, a Laplander is fair when compared with an Abyssinian, and a Tartar if compared with a native of the Molucca islands.—In America, this distinction of colour was not to be found. In the torrid zone there were no negroes, and in the temperate and frigid zones there were no white people. All of them were of a kind of red copper-colour, which Mr Forster observed, in the Pessierays of Terra del Fuego, to have something of a gloss resembling that metal. It doth not appear, however, that this matter hath ever been inquired into with sufficient accuracy. The inhabitants of the inland parts of South America, where the continent is widest, and consequently the influence of the sun the most powerful, have never been compared with those of Canada, or more northerly parts, at least by any person of credit. Yet this ought to have been done, and that in many instances too, before it could be asserted positively as most authors do, that there is not the least difference of complexion among the natives of America. Indeed, so many systems have been formed concerning them, that it is very difficult to obtain a true knowledge of the most simple facts.—If we may believe the Abbe Raynal, the Californians are swarther than the Mexicans; and so positive is he in this opinion, that he gives a reason for it. “This difference of colour,” says he, “proves, that the civilized life of society subverts, or totally changes, the order and laws of nature, since we find, under the temperate zone, a savage people that are blacker than the civilized nations of the torrid zone.”—On the other hand, Dr Robertson classes all the in-

America.

habitants of Spanish America together with regard to colour, whether they are civilized or uncivilized; and when he speaks of California, takes no notice of any peculiarity in their colour more than others.—Certain it is, however, that the northern inhabitants of America are of a colour very different from the Europeans, or even the Asiatics, in the same latitudes; nor are those who dwell under the line so black as negroes.—The general appearance of the Americans in various districts is thus described by Don Antonia Ulloa. They have a very small fore-head, covered with hair towards its extremities, as far as the middle of the eye-brows; little eyes; a thin nose, small, and bending towards the upper lip; the countenance broad; the ears large; the hair very black, lank, and coarse; the limbs well turned; the feet small; the body of just proportion, and altogether smooth and free from hair, until old age, when they acquire some beard, but never on the cheeks.”

Robertson's
History of
Amer. vol. I.
p. 469.

—The chevalier Pinto gives the following account of them. “They are all of a copper colour, with some diversity of shade, not in proportion to their distance from the Equator, but according to the degree of elevation of the territory in which they reside. Those who live in a high country are fairer than those in the marshy low lands on the coast. Their face is round; farther removed, perhaps, than that of any people, from an oval shape. Their fore-head is small; the extremity of their ears far from the face; their lips thick; their nose flat; their eyes black, or of a chestnut colour, small, but capable of discerning objects at a great distance. Their hair is always thick and sleek, and without any tendency to curl. They have no hair on any part of their body but the head. At the first aspect, a South-American appears to be mild and innocent; but, on a more attentive view, one discovers in his countenance something wild, distrustful, and sullen.”

The Americans were also remarkable for their debility of body. They were not only averse to toil, but incapable of it; and when roused by force from their native indolence, and compelled to work, they sunk under tasks which people of the other continent would have performed with ease. On the continent, however, where many tribes employed themselves in hunting, they acquired greater firmness; but still they were more remarkable for agility than strength. Of their swiftness, indeed, surprising accounts are given. Adair *History of* relates the adventures of a Chikakafah warrior, who run America, through woods and over mountains, 300 computed miles P. 396. in a day and an half and two nights.

Another particularity in these people is the smallness of their appetite for food. This was so remarkable, that the Spaniards considered the constitutional temperance of the Americans, not only in the islands, but in several parts of the continent, as far exceeding the abstinence of the most mortified hermits. On the other hand, the appetite of the Spaniards appeared to them to be insatiably voracious. They affirmed, that one Spaniard devoured more food in a day than was sufficient for ten Americans. Nay, they even imagined, that the Spaniards had left their own country because they could not find provisions in sufficient quantity to satisfy their ravenous appetites.

Nor were the Americans less singular in their mental than their corporeal qualities. The understandings of many nations seemed to be so limited, that they were

39
Understand-
ing of the
Americans
very limited.
ed.

America.

neither capable of forming an arrangement for futurity, nor did their solicitude or foresight extend so far. They set no value upon those things of which they were not in some immediate want. In the evening, when a Carribee is going to rest, no consideration will tempt him to sell his hammock; but in the morning, he will part with it for the slightest trifle. At the close of winter, a North-American, mindful of what he has suffered from the cold, sets himself with vigour to prepare materials for erecting a comfortable hut to protect him against the inclemency of the succeeding season: but as soon as the weather becomes mild, he abandons his work, and never thinks of it more, till the return of the cold compels him to resume it.—In short, to be free from labour, seems to be the utmost wish of an American. They will continue whole days stretched in their hammocks, or seated on the earth, without changing their posture, raising their eyes, or uttering a single word. The men seem to be possessed of a degree of insensibility towards the women which is not to be found in any other part of the world; but it was not so with the women at the arrival of the Spaniards among them. Their passions in this respect seemed to be so strong as to swallow up every other consideration, inasmuch that they would have trampled over heaps of their countrymen, in order to give themselves up to the embraces of the barbarians who had deprived them of life; nor would they hesitate at betraying their country, their nearest relations not excepted, into the hands of these strangers.

31
Insatiable
desire of re-
venge.

Notwithstanding the seeming imbecility of their minds in most respects, there is one pursuit in which the Americans are indefatigable beyond what is recorded of any race of men either ancient or modern; and that is revenge. This they carry such a length as we could scarce think would be done by any other than infernal spirits themselves.—Among these savages the forgiveness of enemies is never heard of. They will not attack enemies who are prepared for them; but watch their opportunity to murder them when asleep or incapable of making any resistance. If they find it impossible to revenge themselves when the injury is committed, they will dissemble their resentment, but no length of time is sufficient to eradicate that passion from their breasts; and whenever an opportunity offers, they will revenge themselves with the same hellish fury as if the offence was but just then committed. A single warrior has been known to march several hundred miles to surprise and cut off a straggling enemy. If a quarrel is once begun, these wretches are not satisfied with the destruction of the person who gave the offence; nor will their revenge be satiated with the death of all his family or relations, nothing less is aimed at than the extermination of the whole tribe or nation to which he belongs.—Agreeably to this principle their wars are carried on; and by acting upon this principle the Iroquois actually exterminated a nation called the *Eries*, from which one of the lakes of Canada took its name, so that now there is not the least trace of their existence. When two nations, at war, make peace with one another, it is not because they are weary of slaughter, or that they think they have had revenge enough; but because they find themselves unable to carry on the war any longer. Hence the peace which the savage nations make with one another, may be considered only as a

kind of truce, till both parties have recovered strength enough to renew their hostilities.

America.

As the Indian nations are not populous, and many of them lie at a great distance from one another, it is impossible there could be any animosities between them was the desire of revenge to abate.—For declaring war, against a nation no new provocation is necessary, nor is it even pretended that any has been received. It is the memory of past quarrels only, which are thought not to be sufficiently revenged; that incites them to war.—Private chiefs sometimes invade their neighbour territories without consulting the rulers of the community; nay, often single persons will take the field; and these expeditions are connived at by the elders, as tending to cherish a martial spirit, and to accustom their people to enterprise and danger. If a chief wishes to allure a band of warriors to follow him in invading an enemy's country, his persuasions are addressed to their favourite passion revenge. "The bones of our country-men," says he, "lie uncovered, their bloody bed has not been washed clean. Their spirits cry against us; they must be appeased. Let us go and devour the people by whom they were slain. Sit no longer inactive upon your mats; lift the hatchet; console the spirits of the dead, and tell them that they shall be avenged."—Animated by such exhortations as these, the young men seize their arms, and fall forth against their enemies, singing the war-song, which may be expressed in the following words. "I go to war to revenge the death of my brothers; I shall kill, I shall exterminate, I shall burn my enemies; I shall bring away slaves; I shall devour their heart, dry their flesh, and drink their blood. I shall tear off their scalps, and make cups of their skulls."

Such is the implacable nature of these savages; that they will go, for the purpose of revenge, 1000 miles in pathless woods, over hills and mountains, thro' huge swamps, exposed to the extremities of heat and cold, the vicissitude of seasons, and to hunger and thirst. All these difficulties they despise as trifles, provided they can obtain the scalps of their enemies.—A remarkable instance of their innate desire of blood we have in the following anecdote of an Algonquin woman.

32
Anecdote of
an Algon-
quin wo-
man.

That nation being at war with the Iroquois, she happened to be taken prisoner, and was carried to one of the villages belonging to them. Here she was stripped naked, and her hands and feet bound with ropes in one of their cabins. In this condition she remained ten days, the savages sleeping round her every night. The eleventh night, while they were asleep, she found means to disengage one of her hands, with which she immediately freed herself from the ropes, and went to the door. Tho' she had now an opportunity of escaping unperceived, her revengeful temper could not let slip so favourable an opportunity of killing one of her enemies. The attempt was manifestly at the hazard of her own life; yet, snatching up a hatchet, she killed the savage that lay next her, and, springing out of the cabin, concealed herself in a hollow tree which she had observed the day before. The groans of the dying person soon alarmed the other savages, and the young ones immediately set out in pursuit of her.—Perceiving from her tree, that they all directed their course one way, and that no savage was near her, she left her sanctuary, and, flying by an opposite direction, ran into a forest with-

America.

without being perceived. The second day after this happened, her footprints were discovered; and they pursued her with such expedition, that the third day she discovered her enemies at her heels. Upon this she threw herself into a pond of water, and, diving among some weeds and bulrushes, she could just breathe above water without being perceived. Her pursuers, after making the most diligent search, were forced to return.—For 35 days this woman held on her course through woods and deserts, without any other sustenance than roots and wild berries. When she came to the river St Lawrence, she made with her own hands a kind of a wicker raft, on which she crossed it. As she went by the French fort *Trois Rivières*, without well knowing where she was, she perceived a canoe full of savages; and fearing they might be Iroquois, ran again into the woods, where she remained till sunset.—Continuing her course soon after, she saw *Trois Rivières*, and was then discovered by a party whom she knew to be Hurons, a nation in alliance with the Algonquins. She then squatted down behind a bush, calling out to them that she was not in a condition to be seen, because she was naked. They immediately threw her a blanket, and then conducted her to the fort, where she recounted her story.

33
Method of
making war.

The desire of revenge being so excessively prevalent among the Americans, we can scarce expect that their wars should be any thing else than a series of the most deliberate and diabolical murders that can be conceived. If the war is national, and undertaken by public authority, all their determinations are formal and slow. The elders assemble, and deliver their opinions in solemn speeches. They express themselves in a bold figurative style, with violent gestures. After this, if they happen to be well provided with food, they appoint a feast, of which almost the whole nation partakes. This feast is accompanied with dancing, and songs, in which the real or fabulous exploits of their forefathers are recounted. A leader offers himself to conduct the expedition; but no one is compelled to follow him contrary to his own inclination. All the young men, who are disposed to go to war, give a bit of wood to the chief, as a token of their design. The leader fasts several days, during which he converses with nobody, and is peculiarly careful to observe his dreams, which are generally as favourable as he could wish. A number of other ceremonies are made use of, such as setting the war-kettle on the fire, as an emblem of their going out to devour their enemies; and a large shell is dispatched to their allies, inviting them to come and drink their blood. Having finished all the ceremonies previous to the war, they issue forth with their faces blackened with charcoal, intermixed with streaks of vermilion, which gives them a most horrid appearance. Then they exchange their cloaths with their friends, and dispose of their ornaments to the women, who generally accompany them to a considerable distance.

34
Amazing
quickness of
of their
senses.

As the intention of the Americans in going to war, is, not to conquer, but to destroy, they watch for their enemies in the same manner as they would do for wild beasts.—Being accustomed to perpetual wandering in the forests, their senses are sharpened to a degree inconceivable by us. They can trace out their enemies by the smoke of their fires, which they smell at an immense distance. They can distinguish the tracks of

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their feet on the ground, which would be imperceptible to an European eye. They can even, in these traces, distinguish the footprints of the different nations with which they are acquainted, and determine the precise time when they passed. But these precautions avail them little, as their enemies are no less quicksighted than they. When they go out, therefore, they take care to make use of nothing which might endanger a discovery. They light no fire to warm themselves, or to prepare their victuals; they lie close to the ground all day, and travel only in the night. They march along in files; and he that closes the rear, diligently covers their track with leaves.—As war is begun without provocation, and no declaration of it made, the nation they attack is very often entirely ignorant of their designs, and not at all on their guard. In this case, they follow their track through the forest. They endeavour to become acquainted with their haunts. They lurk in some thicket near thee, with the patience of a sportsman waiting for game; and will continue their station day after day, till they can rush upon their prey when most secure, and least able to resist them. If they meet with no straggling party of the enemy, they advance towards their villages; but with such solicitude to conceal their approach, that they often creep on their hands and feet through the wood, and paint their skins of the same colour with the withered leaves, in order to avoid detection. If they are so fortunate as to remain unobserved, they set on fire the huts in the dead of the night, and massacre the inhabitants as they fly naked and defenceless from the flames. If they hope to effect a retreat without being pursued, they carry off some prisoners, either to adopt them in place of those who may be lost in the war, or to wreak their revenge upon them to the utmost.

35
Shocking
cruelties
practised on
their prisoners.

After they are all returned home, the elders appoint a distribution of the captives; upon which, every person, who has taken a prisoner, presents him where the chiefs direct. If those to whom he is presented receive him, he is immediately adopted, and becomes from that time forward a member of the community; but if he is refused, from whatever motive, his death is unavoidable.—Was it simply death, which was now to be inflicted, the same thing has often been practised by other nations on their prisoners; but here a scene of cruelty is displayed, which, though the invention of those who in other respects seem scarce a degree above brutes, is sufficient to make even an inquisitor tremble.

All the captives who are sentenced to death, being collected together, the whole nation is assembled at the execution, as for some great solemnity. A scaffold is erected, and the prisoners are tied to the stake, where they begin their death-song, and prepare for their torments with the greatest resolution. The conquerors, on the other hand, resolve to put the constancy of the captive to the most severe trial. They begin at the extremity of his body, and gradually approach the more vital parts. One plucks out his nails by the roots, one by one; another takes a finger into his mouth, and tears off the flesh with his teeth; a third thrusts the finger, mangled as it is, into the bowl of a pipe made red hot, which he smokes like tobacco; then they pound his toes and fingers to pieces between two stones; they pull off the flesh with their teeth, cut circles about his joints, and make gashes in the fleshy parts of his limbs, which

America.

which they fear immediately with red-hot irons, cutting, burning, and pinching them alternately; they pull off his flesh, thus mangled and roasted, bit by bit, devouring it with greediness, and smearing their faces with the blood in an enthusiasm of horror and fury. When they have thus torn off the flesh, they twist the bare nerves and tendons about an iron, tearing and snapping them, whilst others are employed in pulling and extending the limbs in every way that can increase the torment. This continues often five or six hours, and sometimes days together. Then they frequently unhind him to give a breathing to their fury, to think what new torments they shall inflict, and to refresh the strength of the sufferer, who, wearied out with such a variety of unheard-of torments, often falls into so profound a sleep, that they are obliged to apply the fire to awake him and renew his sufferings. He is again fastened to the stake, and again they renew their cruelty; they stick him all over with small matches of wood, that easily take fire, but burn slowly; they continually run sharp reeds into every part of his body; they drag out his teeth with pincers, and thrust out his eyes; and, lastly, after having burned his flesh from the bones with slow fires; after having so mangled the body that it is all but one wound; after having mutilated the face in such a manner as to carry nothing human in it; after having peeled the skin from the head, and poured a heap of red-hot coals, or boiling water, on the naked skull; they once more unbind the wretch, who, blind, and staggering with pain and weakness, assaulted and pelted upon every side with clubs and stones, now up, now down, falling into their fires at every step, runs hither and thither, until one of the chiefs, whether out of compassion, or weary of cruelty, puts an end to his life with a club or a dagger. The body is then put into a kettle, and this barbarous employment is succeeded by a feast as barbarous.

36
Surprising
constancy of
the suffer-
ers.

The same infernal spirit which prompts the conquerors to inflict these tortures, prompts the sufferer to bear them without a single complaint. In the midst of the most excruciating torments, he informs his enemies what cruelties he has inflicted on their countrymen, and threatens them with the revenge that will attend his death. Though his reproaches exasperate them to madness, yet he continues his insults; even telling them that they are ignorant of the art of tormenting; and pointing out to them more exquisite methods than what they use, and more sensible parts of the body to be afflicted.

37
Miserable
state of the
American
women.

If we take a view of the Americans in their domestic capacities, we shall find their character no better than what we have described. We have already taken notice of the uncommon indifference of the men towards the women. This, of itself, causes them treat their wives with contempt. Among these savages, also, the man properly buys his wife. In some places, he devotes his service for a certain time to the parents of the maid whom he courts; in others, he hunts for them occasionally, or assists in cultivating their fields and forming their canoes; in others, he offers such presents as are deemed most valuable on account of their usefulness or rarity. In return for these, he receives his wife; and this circumstance, added to the low estimation of women among savages, leads him to consider her as a female servant, whom he has a title to treat as an inferior. In all unpolished nations, the women must bear

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more than their share of the common burden; but in America, their condition is peculiarly grievous, and their depression is so complete, that servitude is a name too mild to describe their wretched state. A wife, among most tribes, is no better than a beast of burden, destined to every office of labour and fatigue. While the men loiter out the day in sloth, or spend it in amusement, the women are condemned to incessant toil. Tasks are imposed upon them without pity, and services are received without complacency or gratitude. They must approach their lords with reverence; they must regard them as more exalted beings; and are not permitted to eat in their preference. There are districts in America where this dominion is so grievous, and so sensibly felt, that some women, in a wild emotion of maternal tenderness, have destroyed their female children in their infancy, in order to deliver them from that intolerable bondage to which they knew they were doomed.

It is not to be expected, that such husbands will inculcate upon their children any kind of filial duty towards their mothers. Indeed, with the American children, neither their fathers nor mothers are objects of greater regard than other persons. They treat them always with neglect; and often with such harshness and insolence, as to fill those with horror who have been witnesses of their conduct. The only piece of education which the savages take care to give their children is, to revenge themselves on their enemies. For this purpose, they teach them to suffer pain in the most extreme degree without uttering the least complaint; that, in case they fall into the hands of their enemies, they may *die like men*, as they term it: and to such an extraordinary length do they go in this respect, that an American boy and girl will often, by way of amusement, hold a burning coal between their naked hands or arms, to try who will soonest shrink, or utter a complaint.

38
Revenge the
only thing
instilled in-
to the Ame-
rican chil-
dren.

As this horrid, implacable desire of revenge is the only mental qualification which the Americans endeavour to cherish, the above-mentioned passive kind of courage becomes the only test of their capacity for any public office. Among the tribes on the banks of the Oroonoko, if a warrior aspires to the post of captain, his probation begins with a long fast, more rigid than any ever observed by the most abstemious hermit. At the close of this, the chiefs assemble; and each gives him three lashes with a large whip, applied so vigorously, that his body is almost flayed. If he betrays the least symptom of impatience, or even of sensibility, he is disgraced for ever, and rejected as unworthy of the honour. After some interval, his constancy is proved by a more excruciating trial. He is laid in his hammock with his hands bound fast; and an innumerable multitude of venomous ants, whose bite occasions a violent pain and inflammation, are thrown upon him. The judges of his merit stand around the hammock; and whilst these cruel insects fasten upon the most sensible parts of his body, a sigh, a groan, or an involuntary motion expressive of what he suffers, would exclude him from the dignity of which he is ambitious. Even after this evidence, his fortune is not deemed to be sufficiently ascertained, till he has stood another test more severe, if possible, than the former. He is again suspended in his hammock, and covered with the leaves of

39
Terrible
trials under-
gone by
their chiefs.

P p

the

America.

the palmetto. A fire of stinking herbs is kindled underneath, so as he may feel its heat, and be involved in smoke. Though scorched and almost suffocated, he must continue to endure this with the same patient insensibility. Many perish in this essay of their firmness and courage; but such as go through it with applause, receive the ensigns of their new dignity with much solemnity, and are ever after regarded as leaders of approved resolution, whose behaviour, in the most trying situations, will do honour to their country. In North America, the previous trial of a warrior is neither so formal, nor so severe: Though, even there, before a fight is permitted to bear arms, his patience and fortitude are proved by blows; by fire; and by insults, more intolerable to a haughty spirit than either.

40
Character of the Americans seems entirely destitute of a good principle.

Thus we have given a particular account of the most remarkable differences between the natives of America, and those of other countries. In their character, we wish, indeed, it were in our power to balance the bad qualities we have mentioned, with some good ones; but we are sorry to say, that in all the different accounts of the native Americans which have fallen into our hands, the virtuous part of their character hath constantly been invisible. Their constancy in bearing the most horrid tortures without a complaint, hath been extolled as the greatest heroism and magnanimity; but we cannot help thinking, it very naturally flows from their inconceivably cruel and blood-thirsty disposition, along with their insatiable desire of revenge, the meanest as well as the most diabolical passion in the human nature. Personal courage they have not; as appears from the following incidents, quoted from Charlevoix, by Lord Kaimes, in his Sketches of the History of Man*. "The fort de Vercheres in Canada, belonging to the French, was, in the year 1690, attacked by some Iroquois: they approached silently, preparing to scale the palisade, when some musket-shot made them retire. Advancing a second time, they were again repulsed, wondering that they could discover none but a woman, who was seen every where. This was Madame de Vercheres, who appeared as resolute as if supported by a numerous garrison. The hopes of storming a place without men to defend it, occasioned reiterated attacks. After two days siege, they retired, fearing to be intercepted in their retreat. Two years after, a party of the same nation appeared before the fort so unexpectedly, that a girl of fourteen, daughter of the proprietor, had but time to shut the gate. With the young woman, there was not a soul but one raw soldier. She shewed herself with her assistant, sometimes in one place, and sometimes in another; changing her dress frequently, in order to give some appearance of a garrison; and always fired opportunely. The faint-hearted Iroquois decamped without success."

We are sensible, that, in denying personal courage to the Americans, we differ from the learned Dr Robertson; who attributes their method of making war to a policy adapted to the smallness of their number, and urges their desperate valour on some extraordinary occasions as a proof of their courage. To this it might easily be replied, that none will fight so desperately as cowards, when they are prevented from running away; and, therefore, it was a maxim among the Spartans, never to pursue a flying enemy too closely, "lest he should think it better to fight, than run away." Be-

sides, savage cruelty hath in all ages been reckoned a sign of cowardice: and we believe there are but few, (in which number we would not wish to include the Doctor) that will not stigmatize, as the most infamous cowards, those who will not face their enemies in the open field, but murder them, together with their helpless women and infants, when asleep. But as it is foreign to our purpose to enter into disputes of this kind, we shall now proceed to consider whether these peculiarities in the Americans give sufficient grounds for determining them, as some authors have done, to be a race of men specifically distinct from all others.

In this question, to avoid being tedious, we shall confine ourselves to what hath been advanced by Lord Kaimes; who is of opinion, that there are many different species of men, as well as of other animals; and gives an hypothesis, whereby his opinion may be maintained in a consistency with Revelation. "If (says he) the only rule afforded by nature for classing animals can be depended on, there are different races of men as well as of dogs: a mastiff differs not more from a spaniel, than a white man from a negro, or a Laplander from a Dane. And, if we have any faith in Providence, it ought to be so. Plants were created of different kinds, to fit them for different climates; and so were brute animals. Certain it is, that all men are not fitted equally for every climate. There is scarce a climate but what is natural to some men, where they prosper and flourish; and there is not a climate but where some men degenerate. Doth not then analogy lead us to conclude, that, as there are different climates on the face of this globe, so there are different races of men fitted for these different climates?"

"M. Buffon, from the rule, That animals which can procreate together, and whose progeny can also procreate, are of one species; concludes, that all men are of one race or species; and endeavours to support that favourite opinion, by ascribing to the climate, to food, or to other accidental causes, all the varieties that are found among men. But is he seriously of opinion, that any operation of climate, or of other accidental cause, can account for the copper-colour and smooth chin universal among the Americans; the prominence of the pudenda universal among the Hottentot women, or the black nipple no less universal among the female Samoiedes?—It is in vain to ascribe to the climate, the low stature of the Esquimaux, the smallness of their feet, or the overgrown size of their heads. It is equally in vain to ascribe to climate, the low stature of the Laplanders, or their ugly visage. The black colour of negroes, thick lips, flat nose, crisped woolly hair, and rank smell, distinguish them from every other race of men. The Abyssinians, on the contrary, are tall and well made, their complexion a brown olive, features well proportioned, eyes large and of a sparkling black, thin lips, a nose rather high than flat. There is no such difference of climate between Abyssinia and Negroland, as to produce these striking differences.

"Nor shall our author's ingenious hypothesis concerning the extremities of heat and cold, purchase him impunity with respect to the fallow complexion of the Samoiedes, Laplanders, and Greenlanders. The Finlanders, and northern Norwegians, live in a climate not less cold than that of the people mentioned; and yet are fair beyond other Europeans. I say more, there

America.

42
Whether they are to be reckoned a distinct species of men.

43
Lord Kaimes's arguments for different species.

41
Instances of their cowardice.

* B. I. Sk. I.

there are many instances of races of people preserving their original colour, in climates very different from their own; but not a single instance of the contrary, as far as I can learn. There have been four complete generations of negroes in Pennsylvania, without any visible change of colour; they continue jet black, as originally. Those who ascribe all to the sun, ought to consider how little probable it is, that the colour it impresses on the parents should be communicated to their infant children, who never saw the sun: I should be as soon induced to believe with a German naturalist, whose name has escaped me, that the negro colour is owing to an ancient custom in Africa, of dyeing the skin black. Let a European, for years, expose himself to the sun in a hot climate, till he be quite brown; his children will nevertheless have the same complexion with those in Europe. From the action of the sun, is it possible to explain, why a negro, like a European, is born with a ruddy skin, which turns jet black the eighth or ninth day."

Our author next proceeds to draw some arguments for the existence of different species of men, from the various tempers and dispositions of different nations; which he reckons to be *specific* differences, as well as those of colour, stature, &c.; and having summed up his evidence, he concludes thus: "Upon summing up the whole particulars mentioned above, would one hesitate a moment to adopt the following opinion, were there no counterbalancing evidence, *viz.* 'That God created many pairs of the human race, differing from each other, both externally and internally; that he fitted those pairs for different climates, and placed each pair in its proper climate; that the peculiarities of the original pairs were preserved entire in their descendants; who, having no assistance but their natural talents, were left to gather knowledge from experience; and, in particular, were left (each tribe) to form a language for itself; that signs were sufficient for the original pairs, without any language; but what nature suggests; and that a language was formed gradually, as a tribe increased in numbers, and in different occupations, to make speech necessary?' But this opinion, however plausible, we are not permitted to adopt; being taught a different lesson by Revelation, *viz.* That God created but a single pair of the human species. Though we cannot doubt of the authority of Moses, yet his account of the creation of man is not a little puzzling, as it seems to contradict every one of the facts mentioned above. According to that account, different races of men were not formed, nor were men formed originally for different climates. All men must have spoken the same language. *viz.* That of our first parents. And what of all seems the most contradictory to that account, is the savage state: Adam, as Moses informs us, was endued by his Maker with an eminent degree of knowledge; and he certainly was an excellent preceptor to his children and their progeny, among whom he lived many generations. Whence then the degeneracy of all men unto the savage state? To account for that dismal catastrophe, mankind must have suffered some terrible convulsion. That terrible convulsion is revealed to us in the history of the tower of Babel, contained in the 11th chapter of Genesis, which is, 'That, for many centuries after the deluge, the whole earth was of one

language, and of one speech; that they united to build a city on a plain in the land of Shinar, with a tower, whose top might reach unto heaven; that the Lord, beholding the people to be one, and to have all one language, and that nothing would be restrained from them which they imagined to do, confounded their language that they might not understand one another, and scattered them abroad upon the face of all the earth.' Here light breaks forth in the midst of darkness. By confounding the language of men, and scattering them abroad upon the face of all the earth, they were rendered savages. And to harden them for their new habitations, it was necessary that they should be divided into different kinds, fitted for different climates. Without an immediate change of constitution, the builders of Babel could not possibly have subsisted in the burning region of Guinea, nor in the frozen region of Lapland; houses not being prepared, nor any other convenience to protect them against a destructive climate."

We shall first remark, on his Lordship's hypothesis, that it is evidently incomplete: for, allowing the human race to have been divided into different species at the confusion of languages, and that each species was adapted to a particular climate; by what means were they to get to the climates proper for them, or how were they to know that such climates existed? How was an American, for instance, when languishing in an improper climate at Babel, to get to the land of the Amazons, or the banks of the Oronoko, in his own country? or how was he to know that these places were more proper for him than others?—If, indeed, we take the scripture-phrase, "The Lord scattered them abroad upon the face of all the earth," in a certain sense, we may account for it. If we suppose that the different species were immediately carried off by a whirlwind, or other supernatural means, to their proper countries, the difficulty will vanish: but if this is his Lordship's interpretation, it is certainly a very singular one.

Before entering upon a consideration of the particular arguments used by our author for proving the diversity of species in the human race; it will be proper to lay down the following general principles, which may serve as axioms. (1.) When we assert a multiplicity of species in the human race, we bring in a supernatural cause to solve a natural phenomenon: for these species are supposed to be the immediate work of the Deity. (2.) No person has a right to call any thing the immediate effect of omnipotence, unless by express revelation from the Deity, or from a certainty that no natural cause is sufficient to produce the effect. The reason is plain. The Deity is invisible, and so are many natural causes: when we see an effect therefore, of which the cause does not manifest itself, we cannot know whether the immediate cause is the Deity, or an invisible natural power. An example of this we have in the phenomena of thunder and earthquakes, which were often ascribed immediately to the Deity, but are now discovered to be the effects of electricity. (3.) No person can assert natural causes to be insufficient to produce such and such effects, unless he perfectly knows all these causes, and the limits of their power in all possible cases: and this no man has ever known, or can know.

By keeping in view these principles, which we hope

America.

are self-evident, we will easily see Lord Kaimes's arguments to consist entirely in a *petitio principii*.—In substance they are all reduced to this single sentence: "Natural philosophers have been hitherto unsuccessful in their endeavours to account for the differences observed among mankind, therefore these differences cannot be accounted for from natural causes."

47
Inconsistency in Lord Kaimes's arguments.

But, besides this negative evidence against his Lordship, we have positive proofs against him, and those of the most unexceptionable kind.—The first evidence we shall produce is *himself*. He tells us in the passages already quoted, that, "a mastiff differs not more from a spaniel, than a Laplander from a Dane;" that "it is vain to ascribe to climate the low stature of the Laplanders, or their ugly visage."—These last words are scarce out of his mouth, when he tells us, in a note on the word *Laplanders*, that "by late accounts it appears, that the Laplanders are only degenerated Tartars; and that they and the Hungarians originally sprung from the same breed of men, and from the same country."—The Hungarians are generally handsome and well made, like Danes, or like other people. The Laplanders, he tells us, differ as much from them as a mastiff from a spaniel. Natural causes, therefore, according to Lord Kaimes himself, may cause two individuals of the same species of mankind differ from each other as much as a mastiff does from a spaniel.

48
Remarkable difference of colour from accidental causes.

While we are treating this subject of colour, it may not be amiss to observe, that a very remarkable difference of colour may accidentally happen to individuals of the same species. In the isthmus of Darien, a singular race of men have been discovered.—They are of low stature, of a feeble make, and incapable of enduring fatigue. Their colour is a dead milk white; not resembling that of fair people among Europeans, but without any blush or sanguine complexion. Their skin is covered with a fine hairy down of a chalky white; the hair of their heads, their eye-brows, and eye-lashes, are of the same hue. Their eyes are of a singular form; and so weak, that they can hardly bear the light of the sun; but they see clearly by moon-light, and are most active and gay in the night. Among the negroes of Africa, as well as the natives of the Indian islands, a small number of these people are produced. They are called *Albias* by the Portuguese, and *Kackerlakes* by the Dutch.

49
Colour no characteristic of a different species.

This race of men is not indeed permanent; but it is sufficient to shew, that mere colour is by no means the characteristic of a certain species of mankind. The difference of colour in these individuals is undoubtedly owing to a natural cause. To constitute, then, a race of men of this colour, it would only be necessary that this cause, which at present is merely accidental, should become permanent, and we cannot know but it may be so in some parts of the world.

50
Nor stature.

If a difference in colour is no characteristic of a different species of mankind, much less can a difference in stature be thought so.—In the southern parts of America, there are said to be a race of men exceeding the common size in height and strength*. This account, however, is doubted of by some; but be that as it will, it is certain that the Esquimaux are as much under the common size, as the Patagonians are said to be above it. Nevertheless we are not to imagine, that either of these are specific differences; seeing the Laplanders and Hun-

* See Patagonia.

garians are both of the same species, and yet the former are generally almost a foot shorter than the latter; and if a difference of climate, or other accidental causes, can make the people of one country a foot shorter than the common size of mankind, undoubtedly accidental causes of a contrary nature may make those of another country a foot taller than other men.

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Though the sun has undoubtedly a share in the production of the swarthy colour of those nations which are most exposed to his influence; yet the manner of living to which people are accustomed, their victuals, their employment, &c. must contribute very much to a difference of complexion. There are some kinds of colouring roots, which, if mixed with the food of certain animals, will tinge even their bones of a yellow colour.—It cannot be thought any great degree of credulity to infer from this, that if these roots were mixed with the food of a white man, they might, without a miracle, tinge his skin of a yellow colour. If a man and woman were both to use food of this kind for a length of time, till they became as it were *radically dyed*, it is impossible, without the intervention of divine power, or of some extraordinary natural cause, but their children must be of the same colour; and was the same kind of food to be continued for several generations, it is more than probable that this colour might resist the continued use of any kind of food whatever.

51
Different causes contribute towards an alteration in colour.

Of this indeed we have no examples, but we have an example of changes much more wonderful.—It is allowed on all hands, that it is more easy to work a change upon the body of a man, or any other animal, than upon his mind. A man that is naturally choleric may indeed learn to prevent the bad effects of his passion by reason, but the passion itself will remain as immutable as his colour. But, to reason in a manner similar to Lord Kaimes; though a man should be naturally choleric, or subject to any other passion, why should his children be so?—This way of reasoning, however plausible, is by no means conclusive, as will appear from the following passage in Mr Forster's *Voyage*.

52
Habit capable of altering the instinct of animals.

June 9th. "The officers who could not yet relish their salt provisions after the refreshments of New Zealand, had ordered their black dog, mentioned p. 135, to be killed: this day, therefore, we dined for the first time on a leg of it roasted; which tasted so exactly like mutton, that it was absolutely undistinguishable. In our cold countries, where animal-food is so much used, and where to be carnivorous perhaps lies in the nature of men, or is indispensably necessary to the preservation of their health and strength, it is strange that there should exist a Jewish aversion to dogs-flesh, when hogs, the most uncleanly of all animals, are eaten without scruple. Nature seems expressly to have intended them for this use, by making their offspring so very numerous, and their increase so quick and frequent. It may be objected, that the exalted degree of instinct, which we observe in our dogs, inspires us with great unwillingness to kill and eat them. But it is owing to the time we spend on the education of dogs, that they acquire those eminent qualities which attach them so much to us. The natural qualities of our dogs may receive a wonderful improvement; but education must give its assistance, without which the human mind itself, though capable of an immense expansion, remains in a very contracted

Voyage round the World, Vol. I. p. 234.

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tracted state. In New Zealand, and (according to former accounts of voyages) in the tropical isles of the south sea, the dogs are the most stupid, dull animals imaginable, and do not seem to have the least advantage in point of sagacity over our sheep, which are commonly made the emblems of silliness. In the former country they are fed upon fish, in the latter on vegetables, and both these diets may have served to alter their disposition. Education may perhaps likewise graft new instincts: the New Zealand dogs are fed on the remains of their master's meals; they eat the bones of other dogs; and the puppies become true cannibals from their birth. We had a young New Zealand puppy on board, which had certainly had no opportunity of tasting any thing but the mother's milk before we purchased it: however, it eagerly devoured a portion of the flesh and bones of the dog on which we dined to-day; while several others of the European breed, taken on board at the Cape, turned from it without touching it.

Ibid. p. 243.

"On the 4th of August, a young bitch, of the terrier breed, taken on board at the Cape of Good Hope, and covered by a spaniel, brought ten young ones, one of which was dead. The New Zealand dog mentioned above, which devoured the bones of the roasted dog, now fell upon the dead puppy, and eat of it with a ravenous appetite. This is a proof how far education may go in producing and propagating new instincts in animals. European dogs are never fed on the meat of their own species, but rather seem to abhor it. The New Zealand dogs, in all-likeness, are trained up from their earliest age to eat the remains of their master's meals: they are therefore used to feed upon fish; their own species; and perhaps human flesh; and what was only owing to habit at first, may have become instinct by length of time. This was remarkable in our cannibal-dog; for he came on board so young, that he could not have been weaned long enough to have acquired a habit of devouring his own species, and much less of eating human flesh; however, one of our seamen having cut his finger, held it out to the dog, who fell to greedily, licked it, and then began to bite it."

From this account it appears, that even the instincts of animals are not unchangeable by natural causes; and if these causes are powerful enough to change the dispositions of succeeding generations, much more may we suppose them capable of making any possible alteration in the external appearance.

We are not here necessitated to confine ourselves to observations made on brute animals. The Franks are an example of the production of one general character, formed by some natural cause from a mixture of many different nations.—They were a motley multitude, consisting of various German nations dwelling beyond the Rhine; who, uniting in defence of their common liberty, took thence the name of *Franks*; the word *frank* signifying in their language, as it still does in ours, *free*. Among them the following nations were mentioned, viz. the Aduarii, Chamavi, Bructeri, Salii, Fritii, Chauci, Amisvarii, and Catti. We cannot suppose one character to belong to so many different nations: yet it is certain that the Franks were nationally characterized as treacherous; and so deeply seems this quality to have been rooted in their nature, that their descendants have not got quite free of it in 1500 years. It is in vain, then, to talk of different species of men,

Confirmed
by an obser-
vation on
the Franks.

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either from their colour, size, or prevailing dispositions, seeing we have undeniable proofs that all these may be changed, in the most remarkable manner, by natural causes, without any miraculous interposition of the Deity.

Having thus, we hope, sufficiently shewn, that there are no good reasons for supposing the Americans to be specifically different from other nations, we must now consider from what part of the old world America has most probably been peopled. This subject hath been very much canvassed; and many conjectures, derived from the similarity of words, customs, &c. have been advanced. All these are very clearly refuted by Dr Robertson; who hath evinced, to the satisfaction of every rational inquirer, that proofs of that kind are entirely fanciful, and may be made to serve any purpose. He himself is of opinion, that it was peopled from the north-eastern part of Asia, on account of the vicinity of the two continents to each other. His reasons we shall give in his own words.

54
Conjectures
concerning
the peopling
of America.

History of
Amer. vol. I.
p. 267.

55
Dr Robert-
son's opin-
ion.

"The actual vicinity of the two continents is so clearly established by modern discoveries, as removes the chief difficulty with respect to the peopling of America. While those immense regions which stretched eastward from the river Ob to the sea of Kamchatka were unknown, or imperfectly explored, the north-east extremities of our hemisphere were supposed to be so far distant from any part of the New World, that it was not easy to conceive how any communication should have been carried on between them. But the Russians, having subjected the western part of Siberia to their empire, gradually extended their knowledge of that vast country, by advancing towards the east into unknown provinces. These were discovered by hunters in their excursions after game, or by soldiers employed in levying the taxes; and the court of Moscow estimated the importance of those countries only by the small addition which they made to its revenue. At length, Peter the Great ascended the Russian throne: His enlightened, comprehensive mind, intent upon every circumstance that could aggrandize his empire, or render his reign illustrious, discerned consequences of those discoveries, which had escaped the observation of his ignorant predecessors. He perceived, that, in proportion as the regions of Asia extended towards the east, they must approach nearer to America; that the communication between the two continents, which had long been searched for in vain, would probably be found in this quarter; and that, by opening this intercourse, some part of the wealth and commerce of the western world might be made to flow into his dominions by a new channel. Such an object suited a genius that delighted in grand schemes. Peter drew up instructions with his own hand for prosecuting this design, and gave orders for carrying it into execution.

Ibid. p. 273.

"His successors adopted his ideas, and pursued his plan. The officers whom the Russian court employed in this service, had to struggle with so many difficulties, that their progress was extremely slow. Encouraged by some faint traditions among the people of Siberia concerning a successful voyage in the year 1648 round the north-east promontory of Asia, they attempted to follow the same course. Vessels were fitted out, with this view, at different times, from the rivers Lena and Kolyma; but in a frozen ocean, which nature seems not to have destined for navigation, they were exposed to

to

to many disasters, without being able to accomplish their purpose. No vessel fitted out by the Russian court ever doubled this formidable cape; we are indebted for what is known of those extreme regions of Asia, to the discoveries made in excursions by land. In all those provinces, an opinion prevails, that countries of great extent and fertility lie at no considerable distance from their own coasts. These the Russians imagined to be part of America; and several circumstances concurred not only in confirming them in this belief, but in persuading them that some portion of that continent could not be very remote. Trees of various kinds, unknown in those naked regions of Asia, are driven upon the coast by an easterly wind. By the same wind, floating ice is brought thither in a few days; flights of birds arrive annually from the same quarter; and a tradition obtains among the inhabitants, of an intercourse formerly carried on with some countries situated to the east.

" After weighing all these particulars, and comparing the position of the countries in Asia which they had discovered, with such parts in the north-west of America as were already known; the Russian court formed a plan, which would have hardly occurred to any nation less accustomed to engage in arduous undertakings and to contend with great difficulties. Orders were issued to build two vessels at Ochotz, in the sea of Kamchatka, to sail on a voyage of discovery. Though that dreary uncultivated region furnished nothing that could be of use in constructing them, but some larch-trees; though not only the iron, the cordage, the sails, and all the numerous articles requisite for their equipment, but the provisions for victualling them, were to be carried through the immense deserts of Siberia, along rivers of difficult navigation, and roads almost impassable, the mandate of the sovereign, and the perseverance of the people, at last surmounted every obstacle. Two vessels were finished; and, under the command of the captains Behring and Tschirikow, sailed from Kamchatka in quest of the New World, in a quarter where it had never been approached. They shaped their course towards the east; and tho' a storm soon separated the vessels, which never rejoined, and many disasters befel them, the expectations from the voyage were not altogether frustrated. Each of the commanders discovered land, which to them appeared to be part of the American continent; and, according to their observations, it seems to be situated within a few degrees of the north-west coast of California. Each set some of his people ashore: but in one place the inhabitants fled as the Russians approached; in another, they carried off those who landed, and destroyed their boats. The violence of the weather, and the distress of their crews, obliged both to quit this inhospitable coast. In their return they touched at several islands, which stretch in a chain from east to west between the country which they had discovered and the coast of Asia. They had some intercourse with the natives, who seemed to them to resemble the North Americans. They presented to the Russians the *calumet*, or pipe of peace, which is a symbol of friendship universal among the people of North America, and an usage of arbitrary institution peculiar to them.

That America may have been peopled from the north-eastern part of Asia, is certainly possible; though

that it actually was so, can by no means be evinced. Indeed, we are led into great difficulties, from whatever place we suppose its inhabitants to have come: for the whole continent, from north to south, was peopled with tribes almost equally savage; and it is not easy to imagine how a few individuals, for we cannot suppose many to have come from these frozen parts of Asia, could have formed themselves into so many different tribes, each having the most inveterate malice against the others. Their colour, too, would incline us to think that their progenitors had been negroes rather than Tartars.

It is certain, that there is a possibility of this continent having been peopled from the East Indies. We do not suppose that any nation ever sent a colony thither. If they had done so, the characteristic marks of that nation would have remained in some degree; but the most savage tribes we have ever heard of on the ancient continent, were civilized nations, when compared with the Americans. So low, indeed, is their capacity said to be, that the very African negroes despise them as a race of men inferior to themselves.

We have already had occasion to observe *, that the general character of a nation depends in a considerable degree upon that of the first founders of it. It is also a certain fact, that living in society will improve the most barbarous nations. Had America, then, been peopled at once, or only received one colony of men into it, it is impossible but the nations must have begun some improvements through length of time.—We shall suppose a colony of Tartars had been by some accident driven on the coast of North America. They would have remembered their ancient customs, and transmitted them to their posterity. These people, we know, have the art of taming animals; and though they could not find animals of the same kind with those they left in their own country, they would undoubtedly have endeavoured to render such as they found in America subservient to them; and the great utility of this practice would infallibly have preserved it when once begun. It is very probable, therefore, that as the Americans had not this art, neither had their ancestors; whom, for that reason, we can scarce suppose to have been any nation in the northern parts of Asia, where that art has been always known.

The excessively savage state of the Americans we may account for by supposing them to have come originally from the southern parts of Asia. From these places of the old continent lie a chain of islands with very moderate distances between them, till we come to the Marquesas and Society Islands, lying between 138° and 155° of W. long. and between 10° and 20° of S. lat. Then, indeed, the connection is in a great measure broken off; but not so much that we can suppose an impossibility of some of the inhabitants of those islands reaching the continent of America. The solitary Island of Easter or S. Carlos lies at a very considerable distance from the Society Isles in lat. 27° 4' S. long. 109° 46' W. and yet the inhabitants are manifestly of the same race, as they speak almost the same language. Here they have very few domestic animals, and consequently must be very deficient in the art of taming them, as they must likewise be in all the south-sea islands for the same reason.

The prodigious inclination the natives of America have

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Another
conjecture.

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Agriculture.

merica. have for war and cruelty, would also lead us to suspect that its first inhabitants have been very soon harrassed by others, who might have arrived shortly after. Being extremely deficient in the necessary arts of life when they arrived, and prevented by the attacks of invaders from paying attention to any thing but their own defence, and having so much room in the immense continent of America to separate, and thereby grow daily more and more savage, they might at last degenerate into a state below what is to be found in any other part of the globe.

That the immense extent of their country conducted very considerably to their extreme savageness, is evident; because in the empires of Mexico and Peru, where the inhabitants were reduced under one governor, and obliged to live in society, they had made a considerable progress in civilization.

Thus have we, as well as others, made a possible conjecture concerning the origin of the Americans. Perhaps it may be thought the more probable, because the countries lying under or near the equator were better peopled than those much to the southward or northward, and we may always suppose those places of a country to be the most populous near which the first inhabitants have arrived. Add to this, that the colour of the natives of the south-sea islands corresponds much better with the general colour of the Americans than that of any other people who are yet known.—We do not here mean to include the *Esquimaux*, who inhabit the eastern coast of Hudson's bay, as they are evidently a distinct race, and probably the same with the Greenlanders.—But we must now leave these regions of conjecture, to give some account of the discovery of this vast continent.

It is believed by many, that the ancients had some imperfect notion of a new world, and several ancient authors are quoted in confirmation of this.—In a book ascribed to the philosopher Aristotle, we are told that the Carthaginians discovered an island far beyond the pillars of Hercules, large, fertile, and finely watered with navigable rivers, but uninhabited. This island was distant a few days sailing from the continent: its beauty induced the discoverers to settle there; but the policy of Carthage dislodged the colony, and laid strict prohibition on all the subjects of the state not to attempt any future establishment. This account is also confirmed by an historian of no mean credit, who relates, that the Tyrians would have settled a colony on the new-discovered island, but were opposed by the Carthaginians for state reasons. The following passage has also been quoted from Seneca's *Medea*, in confirmation of this notion.

—Venient anni
Sæcula feris, quibus oceanus
Vincula rerum laxet, & ingens
Patet tellus, Typisque novos
Delegat orbis; nec sit terris
Ultima Thule.—

ACT III. ver. 375.

Other authors are also quoted in support of this belief: but, however this may be, nobody ever believed the existence of this continent so firmly as to go in quest of it; and the discovery of America was by no means owing to any previous knowledge of its existence, but to the following circumstances.—Towards the close of the 15th century, Venice and Genoa being rivals in com-

merce, in which the former had greatly the superiority; Christopher Columbus, a native of Genoa, whose knowledge of the true figure of the earth, however attained, was much superior to the general notions of the age in which he lived, conceived a project of sailing to the East-Indies by directing his course westward. This design was founded upon a mistake of the geographers of those days, who placed the eastern parts of Asia immensely too far to the eastward; so that, had they been in the right, the shortest way would have been to sail directly westward.—He applied first to his own countrymen; but being rejected by them, he applied to France, where he was laughed at and ridiculed. He next applied to Henry VII. of England; but meeting with a disappointment there, he made an application to Portugal, where he met with the same mortifying reception. Spain was his next resource; where, after eight years attendance, he obtained, in 1492, a fleet of three ships, with which he set sail in quest of the East Indies. He quitted Spain on the 3d of August 1492; and after a tedious navigation, during which his sailors often mutinied, arrived at Guinaya, one of the Lucayo islands, on the 12th of October.

In Columbus's first voyage he contented himself with discovering several of the Lucayo or Bahama islands, with those of Cuba and Hispaniola. On his return to Spain, he found himself as much careased as he had before been mortified and disappointed. His success immediately produced a crowd of adventurers from all nations, who embarked in hopes of making themselves rich by new discoveries; but it was not till 1519, that the extremity of the continent was discovered by a celebrated Portuguese navigator, whose true name was *Fernando de Magalhães*, by the Spaniards called *Hernando Magalhães*, and by the French *Magellan*, from whom the straits between the southern point of the continent and the island of Terra del Fuego take their name.

Notwithstanding the many settlements of the Europeans in this continent, great part of America remains still unknown. The northern continent contains the British colonies of Hudson's bay, Canada, Nova Scotia, New England, New York, New Jersey, Pennsylvania, Maryland, Virginia, North and South Carolina, Georgia, East and West Florida. It contains also the Spanish territories of Louisiana, New Mexico, California, and Mexico. Besides these, there are immense regions to the west and north, the boundaries of which have never yet been discovered. In such as are in any degree known, dwell the *Esquimaux*, the *Algonquins*, the *Hurons*, the *Iroquois*, the *Cherokees*, the *Chikafaws*, and many other tribes of Indians.—In the southern continent lie the Spanish provinces of Terra Firma, Guiana, Peru, Paraguay, and Chili; together with that of Brazil, belonging to the Portuguese; and the country of Surinam, belonging to the Dutch. Vast tracts, however, in the inland parts, are unknown, being comprehended under the general name of *Amazonia*. A large district also, said to be the residence of a gigantic race of men, lies on the east side of the continent, between the straits of Magellan and the province of Paraguay.

The acquisition of these countries was not effected without the most horrid devastations, and massacres of the inhabitants, by the Spaniards. The riches they afford have also been the occasion of much bloodshed among

America.

59
Division of the continent.

60
Advantages &c. from its discovery.

57
Ancients supposed to have some notion of a new world.

58
Discovery of Columbus.

America

Ameltrata.

mong the Europeans themselves; and indeed, were the advantages which the Europeans have gained from their conquests in America, duly contrasted with the losses they have sustained from them, it is doubtful whether the latter would not preponderate.—It is undeniable, however, that many real and solid advantages have accrued to the Europeans by their connections with this continent. Gold and silver have been rendered more plentiful in the European regions than ever they were before. The Materia Medica hath been enriched by the acquisition of the Peruvian bark and Ipecacuanha; medicines of so great efficacy, that their good effects may justly be supposed to balance the bad consequences of the venereal disease said to be imported from thence. But of the riches of America, as well as the history of its different provinces, their inhabitants, manners and customs, &c. we shall treat particularly under the names of each, as they occur in alphabetical order.—[Erratum, in marginal note, n° 11. For *cool*, write *moderate*.]

AMERICUS VESPUTIUS, by the encouragement of Emanuel king of Portugal, made, in 1497, some additional discoveries of that part of the world, which from him is called *America*, tho' first discovered by Columbus, a Genoese, in 1492, as narrated in the preceding article.

AMERSFORT, a city in the Netherlands, in the province of Utrecht, seated on the river Ems, E. long. 5. 20. N. lat. 52. 14. The most remarkable things are, The town-house; the grand palace, which is triangular; the public walk, planted with trees; and the great church, dedicated to St George. The land to the east and south of this city is very fruitful; on the north there is nothing but pasture-ground, and on the west it is woody. Not far from hence is a mountain called *Amersfort-berg*, on which they have planted a vista of trees, which reaches to Utrecht.

AMERSHAM, or AGMONDESHAM, a market-town in Buckinghamshire, consisting of about 200 houses, with a free-school, and four alms-houses. It sends two members to parliament, and has a market on Tuesday. It is a rectory rated at 48l. 16s. 8d. in the king's books. The market-house is a very handsome structure. W. long. o. 15. N. lat. 51. 47.

AMES (William) D. D. a learned independent divine, famous for his controversial writings, was born in 1576, and educated at Christ's college, in Cambridge. In the reign of King James I. he left the university, and soon after the kingdom, on account of his being unwilling to conform to the rules of the church; and retired to the Hague, where he had not been long before he was invited to accept of the divinity-chair in the university of Franeker, in Friesland, which he filled, with admirable abilities, for above twelve years, during which his fame was so great, that many came from remote nations to be educated under him. He from thence removed to Rotterdam, for a change of air which his health demanded; and here he continued during the remainder of his life. His controversial writings, which compose the greatest part of his works, are chiefly against Bellarmine and the Arminians. He also wrote, 1. *A fresh Suit against the Ceremonies.* 2. *Lectiões in Psalmos Davidis.* 3. *Medulla Theologiæ;* and several pieces relative to the sciences. He died of an asthma, at Rotterdam, in Nov. 1633.

AMESTRATA, a town of Sicily, (Cicero); *Ame-*

strator, (Stephanus); *Amastras*, (Silius Italicus); *Mul-tistrator*, (Polybius); now *Misfretta*, in the Val di De-mona, on the river Halesus; a very strong fort of the Carthaginians, besieged in vain by the Romans for seven months with considerable loss; at length, after another siege, taken and rased, (Diodor. Siculus.) The appellation is Phœnician, according to Bochart, *Math-Astrata*, and *Am-Astrata*, the city and people of the goddesses Astrate. The inhabitants are called by Cicero *Ame-stratini*, and *Mutistratini* by Pliny.

AMETHYST, a transparent gem of a purple colour, which seems composed of a strong blue and a deep red; and, according as either of those prevails, affording different tinges of purple, sometimes approaching to violet, and sometimes even fading to a pale rose colour. Though the amethyst is generally of a purple colour, it is nevertheless sometimes found naturally colourless, and may at any time be easily made so by putting it into the fire; in which pellucid or colourless state, it so resembles the diamond, that its want of hardness seems the only way of distinguishing it. Some derive the name *amethyst* from its colour, which resembles wine mixed with water: whilst others, with more probability, think it got its name from its supposed virtue of preventing drunkenness; an opinion, which, however imaginary, prevailed to that degree among the ancients, that it was usual for great drinkers to wear it about their necks. Be this as it will, the amethyst is scarce inferior to any of the gems in the beauty of its colour; and in its purest state is of the same hardness, and at least of equal value, with the ruby and sapphire. It is found of various sizes, from the bigness of a small vetch, to an inch and an half in diameter, and often to much more than that in length. Its shape is extremely various, sometimes roundish, sometimes oblong, and at others flattened, at least on one side: but its most common appearance is in a crystalliform figure, consisting of a thick column, composed of four plants, and terminated by a flat and short pyramid, of the same number of sides; or else, of a thinner and longer hexangular column; and sometimes of a long pyramid, without any column. It makes the gayest figure in the list of these states, but is hardest and most valuable in the roundish and pebble-like form. The amethyst is found in the East and West Indies, and in several parts of Europe; the oriental ones, at least some of the finer specimens, being so hard and bright as to equal any of the coloured gems in value. However, by far the greater number of amethysts fall infinitely short of these; as all the European ones, and not a few of those brought from the East and West Indies, are very little harder than common crystal.

Counterfeit or Falsitious AMETHYST, a kind of glass made of crystal frit, manganese, and saffer; which, in colour, greatly resembles the natural amethyst.

AMETHYST, in heraldry, a term for the purple colour in the coat of a nobleman, in use with those who blazon with precious stones, instead of metals and colours. This, in a gentleman's escutcheon, is called *Purple*; and in those of sovereign princes, *Mercury*.

AMETHYSTEA, AMETHYST; a genus of the monogynia order belonging to the diandria class of plants, of which only one species is known.

This plant is a native of Siberia, from whence the seeds were sent to the imperial garden at Peterburgh, and

Amethyst,
Amethyst.

Amhar
||
Amicable.

and thence brought to Britain. It is an annual plant, with an upright stalk, which rises about a foot high. Towards the top it puts forth two or three small lateral branches, garnished with small trifid leaves, sawed on their edges, of a very dark green colour. The flowers appear in June or July, and are produced in small umbels at the extremities of the branches. They are of a fine blue colour, as are also the upper part of the branches, and the leaves immediately under the umbel, so that they make a fine appearance.

Culture. The seeds of the amethylea should be sown in autumn, as they are apt to remain a whole year in the ground if kept till the spring. When the plants come up, nothing else is necessary than to keep them clear of weeds, and to thin them where they are too close. They ought to be sown where they are to remain, as they do not thrive when transplanted.

AMHAR, or AMHARA, a province of Abyssinia, said to extend forty leagues from east to west. It is considered as the most noble in the whole empire, both on account of its being the usual residence of the Abyssinian monarchs, and having a particular dialect different from all the rest, which, by reason of the emperors being brought up in this province, is become the language of the court and of the polite people. Here is the famed rock Amba-gehzen, where the young monarchs were formerly confined. See AMIA.

AMHURST (Nicholas), an English poet and political writer, was born at Marden in Kent, and entered of St John's college Oxford; from whence he was expelled for irregularity of conduct and libertine principles. Retaining great resentment against the university on this account, he abused its learning and discipline, and some of the most respectable characters in it, in a poem published in 1724, called *Oculus Britannie*, and in a book entitled *Terra Filius*. He published, A Miscellany of poems, sacred and profane; and, The Convocation, a poem in 5 cantos, which was a satire on the bishop of Bangor's antagonists. But he is best known for the share he had in the political paper called *The Craftsman*; tho', after having been the drudge of his party for near 20 years, he was as much forgot in the famous compromise of 1742, as if he had never been born; and, when he died in that year of a broken heart, was indebted to the charity of his bookseller for a grave.

AMIANTHUS, or EARTH-FLAX, in natural history, a fibrous, flexible, elastic, mineral substance, consisting of short, abrupt, and interwoven filaments. It is found in Germany, in the strata of iron ore, sometimes forming veins of an inch in diameter. There is another kind of amianthus, which is to be met with in the marble quarries of Wales. But this kind Linnæus affirms to be an asbestos*. The amianthus does not give fire with steel, nor ferment with acids. It endures an intense heat without injury to its texture.

AMICABLE, in a general sense, denotes any thing done in a friendly manner, or to promote peace.

AMICABLE Benches, in Roman antiquity, were, according to Pitiæus, lower and less honourable seats allotted for the *judices pedanei*, or inferior judges, who, upon being admitted of the emperor's council, were dignified by him with the title *amici*.

AMICABLE Numbers, such as are mutually equal to the sum of one another's aliquot parts. Thus the number 1.

bers 284 and 226 are amicable numbers: for the aliquot parts 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110, of 220, are together equal to the other number 284; and the aliquot parts 1, 2, 4, 7, 14, 22, of 284, are together equal to 220.

AMICTUS, in Roman antiquity, was any upper garment worn over the tunica.

AMICTUS, among ecclesiastical writers, the uppermost garment anciently worn by the clergy; the other five being the alba, finguilum, stola, manipulus, and planeta. The amictus was a linen garment, of a square figure, covering the head, neck, and shoulders, and buckled or clasped before the breast. It is still worn by the religious abroad.

AMICULUM, in Roman antiquity, a woman's upper garment, which differed from the pala. It was worn both by matrons and courtesans.

AMICUS CURIE, a law-term, to denote a bystander who informs the court of a matter in law that is doubtful or mistaken.

AMIDA, (anc. geog.) a principal city of Mesopotamia, (Liber Notitiæ); *Amma*, (Ptolemy); situated on a high mountain, on the borders of Assyria, on the Tigris, where it receives the Nymphius. — It was taken from the Romans, in the time of the emperor Constant, by Sapores king of Persia. The siege is said to have cost him 30,000 men; however, he reduced it to such ruin, that the emperor afterwards wept over it. According to Ammianus Marcellinus, the city was rased; the chief officers were crucified; and the rest, with the soldiers and inhabitants, either put to the sword, or carried into captivity, except our historian himself, and two or three more, who, in the dead of the night, escaped thro' a postern unperceived by the enemy. The inhabitants of Nisibis, however, being obliged to leave their own city by Jovian's treaty with the Persians, soon restored Amida to its former strength; but it was again taken by Cavades in 501, but was restored to the Romans in 503. On the declension of the Roman power, it fell again into the hands of the Persians; but was taken from them by the Saracens in 899. It is now in the possession of the Turks. Here are above 20,000 Christians, who are better treated by the Turks than in other places. A great trade is carried on in this city, of red Turkey leather, and cotton cloth of the same colour. The Arabian name of Amida is *Diarbeker*, and the Turkish one *Kara-Amed*. E. long. 39. o. N. lat. 36. 58.

AMIENS, a handsome, large, and ancient town of France, the capital of Picardy, and a bishop's see. The nave of the cathedral church is a finished piece of building, and the whole structure stately; besides which, there are ten parish-churches, and one in the suburbs, several religious houses, an academy of belles lettres, five gates, and about 35,000 inhabitants. Three branches of the river Somme enter this city, over which there are as many bridges. It lies in the road from Calais to Paris, and was taken by the Spaniards in 1597, by the following stratagem: Soldiers, disguised like peasants, conducted a cart laden with nuts, and let a bag of them fall just as the gate was opened; while the guard was busy in gathering up the nuts, the Spaniards entered, and became masters of the town. It was re-taken by Henry IV. who built a citadel here. It has manufactures in linen and woollen cloth;

Amicius
||
Amiens.

* See *Asbestos*.

Amilcar
||
Ammi.

cloth; and lies in E. Long. 2. 30. N. Lat. 49. 34. **AMILCAR**, the name of several Carthaginian captains. The most celebrated of them is Amilcar Barcas, the father of Hannibal, who, during five years, infested the coast of Italy; when the Romans sending out their whole naval strength, defeated him near Trapani, 242 years before Christ; and this put an end to the first Punic war. Amilcar began the second, and landed in Spain, where he subdued the most warlike nations; but, as he was preparing for an expedition against Italy, he was killed in battle, 228 years before the Christian era. He left three sons, whom he had educated, as he said, like three lions, to tear Rome in pieces; and made Hannibal, his eldest son, swear to an eternal enmity against the Romans.

AMILICTI, in the ancient Chaldean theology, one of the triads of persons in the third order of the divine hierarchy. See **HIERARCHY**.

AMIRANTE, in the Spanish polity, a great officer of state, answering to our lord high-admiral.

AMISUS, the chief city of the ancient kingdom of Pontus. It was built by the Milesians, and peopled partly by them, and partly by a colony from Athens. It was at first a free city, like the other Greek cities in Asia; but afterwards subdued by Pharnaces king of Pontus, who made it his metropolis. It was taken by Lucullus in the Mithridatic war, who restored it to its ancient liberty. Close by Amisus stood another city called *Eupatoria*, from Mithridates Eupator its founder. This city was likewise taken by Lucullus, who levelled it with the ground; but it was afterwards rebuilt by Pompey, who united it with Amisus, giving them the name of *Pompeipolis*. It was taken during the war between Cæsar and Pompey, by Pharnaces king of Pontus, who put most of its inhabitants to the sword; but Cæsar, having conquered Pharnaces, made it again a free city.

AMITTERE LEGEM TERRÆ, among lawyers, a phrase importing the loss of liberty of swearing in any court: The punishment of a champion overcome or yielding in battle, of jurors found guilty in a writ of attain, and of a person outlawed.

AMITERNUM, a town of the Sabines, in Italy, (Livy, Pliny); now extinct: The ruins are to be seen on the level ridge of a mountain, near S. Vittorino, and the springs of the Aternus; not far from Aquila, which rose out of the ruins of Amiternum. The inhabitants are called *Amiternini*, (Livy, Pliny.) The epithet, *Amiternus*, (Virgil.)

AMMA, among ecclesiastical writers, a term used to denote an abbe's or spiritual mother.

AMMAN, or **AMMANT**, in the German and Belgic policy, a judge who has the cognizance of civil causes.—It is also used among the French for a public notary, or officer who draws up instruments and deeds.

AMMANIA, a genus of the monogynia order belonging to the tetrandria class of plants.—Of this genus there are three species enumerated; all of them natives of warm climates. They have no beauty or other remarkable property, and consequently merit no further description.

AMMI, **BISHOP'S-WEED**, a genus of the digynia order, belonging to the pentandria class of plants. Of this there are three

Species. 1. The majus, or common bishop's-weed,

whose seeds are used in medicine. 2. The glaucifolium, with all its leaves cut in the shape of a spear. 3. The copticum, or Egyptian bishop's-weed.

Culture, &c. The first is an annual plant; and therefore is to be propagated by seeds sown in the autumn, in the place where the plants are to remain. In the spring, the ground should be hoed, to cut up the weeds, and also to thin the plants, in the same manner as is practised for carrots, leaving them four or five inches asunder; or if the ground is good where they grow, they must be left at least six inches distant. After this they will require no farther care than to keep them clear of weeds. They will flower in June, and the seeds will ripen in August. They should be gathered as they ripen, otherwise they will soon scatter. This plant will grow in any open situation, but thrives best in a light sandy soil. The second sort is perennial, and very hardy. It thrives best in a moist soil, and may be propagated by seeds in the same manner as the former.

The third species is now no otherwise known, than by the figure of its seeds, which were formerly used in medicine, but have long since given place to those of the common kind. The seeds of the ammi copticum are small, striated, of a reddish brown colour, a warm pungent taste, and a pleasant smell approaching to that of origanum. They are recommended as stomachic, carminative, and diuretic; but have long been strangers to the shops. The seeds of the ammi majus, which are used in their place, are much weaker both in taste and smell, and without the origanum flavour of the other.

AMMIANUS (Marcellinus), an historian, born at Antioch. He wrote in Latin, an interesting history, of which there are now only 18 books extant. Though a Pagan, he speaks with candour and moderation of the Christian religion, and even praises it: his hero is the emperor Julian. He died about the year 390. The best edition of his history is that of Gronovius, in 1693.

AMMIRATO (Scipio), an eminent Italian historian, born at Lecca in Naples in 1531. After travelling over great part of Italy, without settling to his satisfaction, he was engaged by the great duke of Tuscany to write *The History of Florence*; for which he was presented to a canonry in the cathedral there. He wrote other works while in this station; and died in 1600.

AMMODYTES, or **SAND-EEL**, in ichthyology, a genus of fishes belonging to the order of apodes. This fish resembles an eel, and seldom exceeds a foot in length. The head of the ammodytes is compressed, and narrower than the body; the upper jaw is larger than the under; the body is cylindrical, with scales hardly perceptible. There is but one species of the ammodytes, viz. the tobianus, or launce, a native of Europe. This fish gathers itself into a circle, and pierces the sand with its head in the centre. It is found in most of our sandy shores during some of the summer-months: it conceals itself, on the recess of the tides, beneath the sand, in such places where the water is left, at the depth of about a foot; and is in some places dug out, in others drawn up by means of a hook contrived for that purpose. They are commonly used as baits for other fish, but they are also very delicate eating. These fish are found in the stomach of the *Porpess*; an argument that the last roots up the sand with its

Ammi
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Ammo-
dytes.

nasc

Ammon. nose, as hogs do the ground.

AMMON, anciently a city of Marmarica, (Ptolemy). Arrian calls it a *place*, not a city, in which stood the temple of Jupiter Ammon, round which there was nothing but sandy wastes. Pliny says, That the oracle of Ammon was twelve days journey from Memphis, and among the *Nomi* of Egypt he reckons the *Nomos Ammoniacus*: Diodorus Siculus, That the district where the temple stood, tho' surrounded with deserts, was watered by dews which fell nowhere else in all that country. It was agreeably adorned with fruitful trees, and springs, and full of villages. In the middle stood the acropolis or citadel, encompassed with a triple wall; the first and inmost of which contained the palace; the others the apartments of the women, the relations and children, as also the temple of the god, and the sacred fountain for lustrations. Without the acropolis stood, at no great distance, another temple of Ammon, shaded by a number of tall trees: near which there was a fountain, called that of the sun, or *Solis Fons*, because subject to extraordinary changes according to the time of the day; morning and evening warm, at noon cold, at midnight extremely hot. A kind of fossil salt was said to be naturally produced here. It was dug out of the earth in large oblong pieces, sometimes three fingers in length, and transparent as crystal. It was thought to be a present worthy of kings, and used by the Egyptians in their sacrifices.—From this, our sal-ammoniac has taken its name.

AMMON, or HAMMON, in heathen mythology, the name of the Egyptian Jupiter, worshipped under the figure of a ram.

Bacchus having subdued Asia, and passing with his army through the deserts of Africa, was in great want of water: but Jupiter, his father, assuming the shape of a ram, led him to a fountain, where he refreshed himself and his army; in requital of which favour, Bacchus built there a temple to Jupiter, under the title of *Ammon*, from the Greek *αμμος*, which signifies *sand*, alluding to the sandy desert where it was built. His oracles lasted till the time of Theodosius.

AMMON, the father of the Ammonites, was the son of Lot by his youngest daughter. Gen. xix. 38.

AMMON (Andreas), an excellent Latin poet, born at Lucca in Italy, was sent by Pope Leo X. to England, in the characters of prothotary of the Apostolic See, and collector-general of this kingdom. Being a man of singular genius and learning, he soon became acquainted with the principal literati of those times; particularly with Erasmus, Colet, Grocyn, and others, for the sake of whose company he resided some time at Oxford. Ammon was Latin secretary to Henry VIII. but at what time he was appointed does not appear. In 1512, he was made canon and prebendary of the collegiate chapel of St Stephen, in the palace of Westminster. He was likewise prebendary of Wells; and in 1514, was presented to the rectory of Dychial in that diocese. About the same time, by the king's special recommendation, he was also made prebendary of Salisbury. He died in the year 1517, and was buried in St Stephen's chapel in the palace of Westminster. He was esteemed an elegant Latin writer, and an admirable poet. The epistles of Erasmus to Ammon abound with encomiums on his genius and learning.—His works are, 1. *Epistole ad Erasmus*, lib. i.

2. *Scotici confictus historia*, lib. i. 3. *Bucolica vel eclogæ*, lib. i. Basil 1546, 8vo. 4. *De rebus nihil*, lib. i. 5. *Panegyricus quidam*, lib. i. 6. *Varii generis epigrammata*, lib. i. 7. *Poemata diversa*, lib. i.

AMMONIAC, a concrete gummy resinous juice, brought from the East-Indies, usually in large masses, composed of little lumps or tears, of a milky colour, but soon changing, upon being exposed to the air, of a yellowish hue. We have no certain account of the plant which affords this juice; the seeds usually found among the tears resemble those of the umbelliferous class. Such tears as are large, dry, free from little stones, seeds, or other impurities, should be picked out, and preferred for internal use: the coarser kind is purified by solution and colature, and then carefully inspissating it; unless this be artfully managed, the gum will lose a considerable deal of its more volatile parts. There is often vendued in the shops, under the name of strained gum ammoniacum, a composition of ingredients much inferior in virtue.

Ammoniac has a nauseous sweet taste, followed by a bitter one; and a peculiar smell, somewhat like that of galbanum, but more grateful: it softens in the mouth, and grows of a whiter colour upon being chewed. Thrown upon live coals, it burns away in flame: it is in some measure soluble in water and in vinegar, with which it assumes the appearance of milk; but the resinous part, amounting to about one half, subsides on standing.

Ammoniac is an useful decostruent, and frequently prescribed for opening obstructions of the abdominal viscera, and in hysterical disorders occasioned by a deficiency of the menstrual evacuations. It is likewise supposed to deterge the pulmonary vessels; and proves of considerable service in some kinds of asthma, where the lungs are oppressed by viscid phlegm: in this intention, a solution of gum ammoniac in vinegar of squills proves a medicine of great efficacy, though not a little unpleasant. In long and obstinate colics proceeding from viscid matter lodged in the intestines, this gummy resin has produced happy effects, after the purges and the common carminatives had been used in vain. Ammoniac is most commodiously taken in the form of pills; about a scruple may be given every night, or oftener. Externally, it softens and ripens hard tumours: a solution of it in vinegar stands recommended by some for resolving even scirrhus swellings.

Sal AMMONIAC, a volatile salt, of which there are two kinds, ancient and modern. The ancient fort, described by Pliny and Dioscorides, was a native salt, generated in those large inns or caravanseras, where the crowd of pilgrims, coming from the temple of Jupiter Ammon, used to lodge; who, in those parts, traveling upon camels, and those creatures when in Cyrene, a province of Egypt, where that celebrated temple stood, urining in the stables, or (say some) in the parched sands, out of this urine, which is remarkably strong, arose a kind of salt, denominated sometimes, from the temple, *Ammoniac*, and sometimes, from the country, *Cyreniac*. Since the cessation of these pilgrimages, no more of this salt is produced there; and, from this deficiency, some suspect there never was any such thing: But this suspicion is removed, by the large quantities of a salt, nearly of the same nature, thrown out by mount Ætna. The characters of the ancient sal am-

Ammonitæ niae are, that it cools water, turns aqua fortis into aqua regia, and consequently dissolves gold.

Amomum.

The modern *sal armoniac* is entirely factitious; for which, see CHEMISTRY, n° 125, 189, 232, 234, 276, 331.

AMMONITÆ, in natural history. See CORNU *Ammonis*.

AMMONITIS, (anc. geogr.) a country of Arabia Petraea, occupied by the children of Ammon, whence the appellation. Its limits partly to the west and partly to the north were the river Jabbok, whose course is now where determined; though Josephus says, that it runs between Rabbath-Ammon, or Philadelphia, and Gerafa, and falls into the Jordan.

AMMONIUS, surnamed **SACEAS**, was born in Alexandria, and flourished about the beginning of the third century. He was one of the most celebrated philosophers of his age. He took great pains in reconciling the differences between the Platonists and Peripatetics, in which he gained great reputation. Plotinus and Origen were both his disciples. He died about the year 230.

AMMONIUS, surnamed **LITHOTOME**, a celebrated surgeon of Alexandria, so called from his inventing the operation of drawing the stone out of the bladder.

AMMUNITION, a general term for all warlike provisions, but more especially powder, ball, &c.

Ammunition, arms, utensils of war, gun-powder, imported without licence from his Majesty, are, by the laws of England, forfeited, and triple the value. And again, such licence obtained, except for furnishing his Majesty's public stores, is to be void, and the offender to incur a prebunne, and to be disabled to hold any office from the crown.

AMMUNITION Bread, Shoes, &c. such as are served out to the soldiers of an army or garrison.

AMNESTY, in matters of policy, denotes a pardon granted by a prince to his rebellious subjects, usually with some exceptions: such was that granted by Charles II. at his restoration.—The word is formed from the Greek ἀμνηστία, the name of an edict of this kind published by Thrásibulus, on his expulsion of the tyrants out of Athens.

AMNIOS, in anatomy, a thin pellucid membrane which surrounds the fœtus in the womb.*

AMOEBAEUM, in ancient poetry, a kind of poem representing a dispute between two persons, who are made to answer each other alternately: such are the third and seventh of Virgil's eclogues.

AMOL, a town of Asia, in the country of the Ufbeckes, seated on the river Gihon. E. Long. 64. 30 N. Lat. 39. 20.

AMOMUM, in botany, a genus of the monogynia order, belonging to the monandria class of plants.—Of this genus there are four

Species. 1. The zingiber, or common ginger, is a native of the East, and also of some parts of the West Indies; where it grows naturally without culture. The roots are jointed, and spread in the ground: they put out many green reed-like stalks in the spring, which arise to the height of two feet and an half, with narrow leaves. The flower-stems arise by the side of these, immediately from the root; these are naked, ending with an oblong scaly spike. From each of these scales is produced a single

blue flower, whose petals are but little lower than the squamous covering. 2. The zerumbet, or wild ginger, is a native of India. The roots are larger than those of the first, but are jointed in the same manner. The stalks grow from three to near four feet high, with oblong leaves placed alternately. The flower-stems arise immediately from the root: these are terminated by oblong, blunt, scaly heads; out of each scale is produced a single white flower, whose petals extend a considerable length beyond the scaly covering. 3. The cardamomum, or cardamom, is likewise a native of India; but is little known in this country except by its seeds, which are used in medicine. Of this there is a variety, with smaller fruit, which makes the distinction into cardamomum majus and minus. The first, when it comes to us, is a dried fruit or pod about an inch long, containing, under a thick skin, two rows of small triangular seeds of a warm aromatic flavour. The cardamomum minus is a fruit scarce half the length of the foregoing, but considerably stronger both in smell and taste. 4. The grana paradisi species is likewise a native of the East-Indies. The fruit containing the grains of paradise is about the size of a fig, divided into three cells, in each of which are contained two roots of small seeds like cardamoms. They are somewhat more grateful, and considerably more pungent, than cardamoms.

Culture. The first two species are tender, and require a warm stove to preserve them in this country. They are easily propagated by parting the roots in the spring. These should be planted in pots filled with light rich earth, and plunged into a hot-bed of tanner's-bark, where they must constantly remain. Cardamoms and grains of paradise are not cultivated in this country. If we may believe the Abbe Raynal, the former propagate themselves, in those countries where they are natives, without either sowing or planting. Nothing more is required than, as soon as the rainy season is over, to set fire to the herb which has produced the fruit.

Uses. The dried roots of the first species are of great use in the kitchen, as well as in medicine. They furnish a considerable export from some of the American islands. The green roots, preserved as a sweet-meat, are preferable to every other kind. The Indians mix them with their rice, which is their common food, to correct its natural insipidity. This spice, mixed with others, gives the dishes seasoned with it a strong taste, which is extremely disagreeable to strangers. The Europeans, however, who come into Asia without fortunes, are obliged to conform to it. The others adopt it out of complaisance to their wives, who are generally natives of the country.—Ginger is a very useful spice, in cold flatulent colics, and in laxity and debility of the intestines; it does not heat so much as those of the pepper kind, but its effects are much more durable. The cardamoms and grains of paradise have the same medicinal qualities with ginger.

ANOMUM Verum, or **True Anomum**, is a round fruit, about the size of a middling grape; containing, under a membranous cover, a number of small rough angular seeds, of a blackish brown colour on the outside, and whitish within: the seeds are lodged in three distinct cells; those in each cell are joined closely together, so as that the fruit, upon being opened, appears to contain only three seeds. Ten or twelve of these

these

Amontons these fruits grow together in a cluster; and adhere, without any pedicle, to a woody stalk about an inch long: each single fruit is surrounded by six leaves, in form of a cup; and the part of the stalk void of fruit is clothed with leafy scales.—The husks, leaves, and stems, have a light grateful smell, and a moderately warm aromatic taste: the seeds, freed from the husks, are in both respects much stronger; their smell is quick and penetrating, their taste pungent, approaching to that of camphor. Notwithstanding amomum is an elegant aromatic, it has long been a stranger to the shops. See *MATERIA MEDICA*, n° 97.

AMOMUM *Vulgate*. See *SISON*.

AMONTONS (William), an ingenious experimental philosopher, was born at Paris in 1663. While he was at the grammar-school, he by sickness contracted a deafness that almost excluded him conversation: in this situation, he applied himself to mechanics and geometry; and, it is said, refused to try any remedy for his disorder, either because he deemed it incurable, or because it increased his attention. He studied the nature of barometers and thermometers with great care; and wrote *Observations and Experiments concerning a new Hour-glass, and concerning Barometers, Thermometers, and Hygroscopes*; which, with some pieces in the *Journal des Sçavans*, are all his literary works. When the royal academy was new regulated in 1699, he was admitted a member; and read his *New Theory of Friction*, in which he happily cleared up an important object in mechanics. He died in 1705.

AMORÆANS, a sect or order of gemaric doctors, or commentators on the Jerusalem Talmud. The Amoræans succeeded the Mischnic doctors. They subsisted 250 years; and were succeeded by the Seburæans.

AMORGOS, or **AMURGUS**, (anc. geogr.) now *Morgo*, not far from Naxos to the east, one of the European Sporades; the country of Simonides the Iambic poet; (Strabo.) To this island criminals were banished, (Tacitus.) It was famous for a fine flax called *Emorgis*. See *MORGO*.

AMORITES. See *AMORRHITIS*.

AMORIUM, a town of Phrygia Major, near the river Sangarius, on the borders of Galatia.—It was taken from the Romans by the Saracens in 668; but soon after retaken by the Romans.—A war breaking out again between these two nations in 837, the Roman emperor Theophilus destroyed Sozopetra the birth-place of the khalif Aḡ Motaḡem, notwithstanding his earnest intreaties to him to spare it. This so enraged the khalif, that he ordered every one to engrave upon his shield the word *Amorium*, the birth-place of Theophilus, which he resolved at all events to destroy. Accordingly he laid siege to the place, but met with a vigorous resistance. At length, after a siege of 55 days, it was betrayed by one of the inhabitants who had abjured the Christian religion. The khalif, exasperated at the loss he had sustained during the siege, put most of the men to the sword, carried the women and children into captivity, and levelled the city with the ground. His forces being distressed for want of water on their return home, the Christian prisoners rose upon some of them, and murdered them; upon which the khalif put 6000 of the prisoners to death.—According to the eastern historians, 30,000 of the inhabitants of Amorium were slain, and as many carried

into captivity.

AMORPHA, *BASTARD INDIGO*, a genus of the decandria order, belonging to the diadelphia class of plants.

Of this there is only one known species, a native of Carolina, where the inhabitants formerly made from it a coarse kind of indigo, whence the plant took its name. It rises, with many irregular stems, to the height of 12 or 14 feet, garnished with very long winged leaves, in shape like those of the common acacia. At the extremity of the same year's shoots, the flowers are produced in long slender spikes of a deep purple colour. After they are past, the germen turns to a short pod, having two kidney-shaped seeds; but these do not ripen in Britain. The seeds of this plant were first sent to England by Mr Mark Cateby in 1724, from which many plants were raised in the gardens near London. These were of quick growth, and several of them produced flowers in three years.

Culture. The amorpha is most readily propagated by seeds, which ought to be procured annually from America. It may also be propagated by laying down the young branches, which in one year will make good roots; and may then be taken off, and planted either in the nursery, or in the places where they are designed to remain. If they are put into a nursery, they should not remain there more than one year; for as the plants make large shoots, they do not remove well when they have remained long in a place.

AMORRHITIS, (anc. geogr.) the country of the Amorites, situated, according to Josephus, between three rivers, like an island: the Arnon on the south, the Jabbok on the north, and the Jordan on the west. The *Amorite*, or *Amorrhæi*, took their name from *Amor*, or *Emor*, the son of Canaan. They dwelt in the mountains of Judah to the south, and in some parts mixed with the Hethæi; also about Sichem: was a great part of them crossed the Jordan, and in a hostile manner occupied a considerable part of the country of the Moabites and Ammonites; which afterwards fell to the Israelites, on the defeat of Sihon their king.

AMORTIZATION, in law, the alienation of lands or tenements to a corporation or fraternity and their successors. See *MORTMAIN*.

AMOS, the third of the twelve lesser prophets, was an herdsman of the city of Tekoa. He prophesied under Uzzias and Jeroboam II. and foretold the captivity and re-establishment of the ten tribes. He was put to death by Amasias priest of Bethel, about 785 years before Christ.—He ought not to be confounded with Amos, the father of Iſaiah.

AMOY, an island in the province of Fokien, in China, where the English had a factory: but they have abandoned it, on account of the impositions of the inhabitants. Long. 136. o. lat. 24. 30. It has a fine port, that will contain many thousand vessels. The emperor has a garrison here of 7000 men.

AMPELIS, the vine, in botany. See *VITIS*.

AMPELIS, the *Chatterer*, in zoology, a genus of birds belonging to the order of passeræ; the distinguishing characters of which are, that the tongue is furnished with a rim or margin all round, and the bill is conical and straight. There are seven species, all natives of foreign countries, except the garrulus, which is a native both of Europe and the West-Indies. In the

Amorpha
||
Ampelis.

Ampelis
||
Amphiar-
us.

the former, the native country of these birds is Bohemia; from whence they wander over the rest of Europe, and were once superstitiously considered as prefiges of a pestilence. They appear annually about Edinburgh, in February; and feed on the berries of the mountain-ash. They also appear as far south as Northumberland; and, like the field-fare, make the berries of the white-thorn their food. It is but by accident that they ever appear further south. They are gregarious; feed on grapes, where vineyards are cultivated; are easily tamed; and are esteemed delicious food. This species is about the size of the black-bird: the bill is short, thick, and black; on the head is a sharp pointed crest reclining backwards: the lower part of the tail is black; the end of a rich yellow: the quill-feathers are black, the three first tips with white; the six next have half an inch of their exterior margin edged with fine yellow, the interior with white. But what distinguishes this from all other birds, are the horny appendages from the tips of seven of the secondary feathers, of the colour and gloss of the best red wax.

AMPELITES, CANNEL-COAL, a hard, opaque, fossil, inflammable substance, of a black colour. It does not effervesce with acids. The ampelites, though much inferior to jet in many respects, is yet a very beautiful fossil; and, for a body of so compact a structure, remarkably light. Examined by the microscope, it appears composed of innumerable very small and thin plates, laid closely and firmly on one another; and full of very small specks of a blacker and more shining matter than the rest, which is evidently a purer bitumen than the general mass. These specks are equally diffused over the different parts of the masses. There is a large quarry of it near Alençon in France. It is dug in many parts of England, but the finest is in Lancashire and Cheshire; it lies usually at considerable depths. It makes a very brisk fire, flaming violently for a short time, and after that continuing red and glowing hot a long while; and finally is reduced into a small proportion of grey ashes, the greater part of its substance having flown off in the burning.—It is capable of a very high and elegant polish; and, in the countries where it is produced, is turned into a vast number of toys, as snuff-boxes and the like, which bear all the nicety of turning, and are made to pass for jet.—Husbandmen smear their vines with it, as it kills the vermin which infests them. It is likewise used for the dyeing of hair black. In medicine, it is reputed good in colics, against worms, and of being in general an emollient and disiccant; but the present practice takes no notice of it.

AMPELUSIA, a promontory of Mauritania Tingitana, called *Cottes* by the natives, which is of the same signification, (Mela); with a town of the same name, (Pliny); not far from the river Lixus, near the straits of Gibraltar: now *Cape Spartel*. W. Long. 6. 30. Lat. 36. 0.

AMPHERES, in antiquity, a kind of vessels wherein the rowers plied two oars at the same time, one with the right hand, and another with the left.

AMPHIATHROSIS, in anatomy, a term for such junctures of bones as have an evident motion, but differ from the diarthrosis, &c. See *DIARTHROSIS*.

AMPHIARAUS, in pagan mythology, a celebrated prophet, who possessed part of the kingdom of Ar-

gos. He was believed to excel in divining by dreams, and is said to be the first who divined by fire. Amphiarus knowing, by the spirit of prophecy, that he should lose his life in the war against Thebes, hid himself in order to avoid engaging in that expedition: but his wife Eriphyle, being prevailed upon by a present, discovered the place in which he had concealed himself; so that he was obliged to accompany the other princes who marched against Thebes. This proved fatal to him; for the earth being split asunder by a thunder-bolt, both he and his chariot were swallowed up in the opening.—Amphiarus, after his death, was ranked among the gods; temples were dedicated to him; and his oracle, as well as the sports instituted to his honour, were very famous.

AMPHIBIA, in zoology, the name of Linnæus's third class of animals; including all those which live partly in water, and partly on land. This class he subdivides into four orders, *viz.* The amphibia reptiles; the amphibia serpentes; the amphibia nantes; and the amphibia meantes. See *ZOOLOGY*.

It has been a question whether the animals commonly called *amphibious*, live most in the water or on land. If we consider the words *ænes* (*utrinque*, both ways), and *bios* (*vita*, life), from which the term *amphibious* is derived; we should understand, that animals, having this title, should be capable of living as well by land, or in the air, as by water; or of dwelling in either constantly at will: but it will be difficult to find any animal that can fulfil this definition, as being equally qualified for either. An ingenious naturalist*, therefore, from considering their economy respectively, divides them into two orders, *viz.* 1. Such as enjoy their chief functions by land, but occasionally go into the water. 2. Such as chiefly inhabit the water, but occasionally go ashore. What he advances on this subject is curious, and well illustrates the nature of this class. 1. Of the first order, he particularly considers the phocæ; and endeavours to shew, that none of them can live chiefly in the water, but that their chief enjoyment of the functions of life is on shore.

These animals (he observes) are really quadrupeds*; but, as their chief food is fish, they are under a necessity of going out to sea to hunt their prey, and to great distances from shore; taking care that, however great the distance, rocks or small islands are at hand, as resting-places when they are tired, or when their bodies become too much macerated in the water; and they return to the places of their usual resort to sleep, copulate, and bring forth their young, for the following reasons, *viz.* It is well known, that the only essential difference (as to the general structure of the heart) between amphibious and mere land animals, or such as never go into the water, is, that in the former the oval hole remains always open. Now, in such as are without this hole, if they were to be immersed in water for but a little time, respiration would cease, and the animal must die; because a great part of the mass of blood passes from the heart by the pulmonary artery through the lungs, and by the pulmonary veins returns to the heart, while the aorta is carrying the greater part of the mass to the head and extremities, &c.

Now, the blood passes through the lungs in a continual uninterrupted stream, while respiration is gentle and moderate; but when it is violent, then the circulation

* Dr Parsons; in a paper read before the Royal Society, 1767.

* See the article *Phoca*.

Amphibia.

lation is interrupted, for inspiration and expiration are now carried to their extent; and in this state the blood cannot pass through the lungs either during the total inspiration or total expiration of the air in breathing; for, in the former case, the inflation compresses the returning veins; and, in the latter, by the collapion of the lungs, these veins are interrupted also; so that it is only between these two violent actions that the blood can pass: and hence it is, that the lives of animals are shortened, and their health impaired, when they are subjected to frequent violent respiration; and thus it is, that when animals have once breathed, they must continue to respire ever after, for life is at an end when that ceases.

There are three necessary and principal uses of respiration in all land-animals, and in those kinds that are counted amphibious.—The first is that of promoting the circulation of the blood through the whole body and extremities. In real fishes, the force of the heart is alone capable of sending the blood to every part, as they are not furnished with limbs or extremities; but in the others mentioned, being all furnished with extremities, respiration is an assistant force to the arteries in sending blood to the extremities, which, being so remote from the heart, have need of such assistance, otherwise the circulation would be very languid in these parts: thus we see, that, in persons subject to asthmatic complaints, the circulation grows languid, the legs grow cold and oedematous, and other parts suffer by the defect in respiration.—A second use of breathing is, that, in inspiration, the variety of particles, of different qualities, which float always in the air, might be drawn into the lungs, to be insinuated into the mass of blood, being highly necessary to temperate and cool the agitated mass, and to contribute refined pabulum to the finer parts of it, which, meeting with the daily supply of chyle, serves to assimilate and more intimately mix the mass, and render its constitution the fitter for supporting the life of the animal. Therefore it is, that valitudinarians, by changing foul or unwholesome air for a free, good, open air, often recover from lingering diseases.—A third principal use of respiration is, to promote the exhibition of voice in animals; which all those that live on the land do according to their specific natures.

From these considerations it appears, that the phoca of every kind are under an absolute necessity of making the land their principal residence. But there is another very convincing argument why they reside on shore the greatest part of their time; namely, that the flesh of these creatures is analogous to that of other land animals; and therefore, by over long maceration, added to the fatigue of their chasing their prey, they would suffer such a relaxation as would destroy them. It is well known, that animals, which have lain long under water, are reduced to a very lax and even putrid state; and the phoca must bask in the air on shore: for while the solids are at rest, they acquire their former degree of tension, and the vigour of the animal is restored; and while he has an uninterrupted placid respiration, his blood is refreshed by the new supply of air, as explained above, and he is rendered fit for his next cruise: for action wastes the most exalted fluids of the body, more or less, according to its duration and violence; and the sessorative rest must continue a longer or shorter time,

according to the quantity of the previous fatigue.

Let us now examine by what power these animals are capable of remaining longer under water than land-animals.

All these have the oval hole open between the right and left auricles of the heart; and, in many, the canalis arteriosus also: and while the phoca remains under water, which he may continue an hour or two more or less, his respiration is stopped; and the blood, not finding the passage thro' the pulmonary artery free, rushes through the hole from the right to the left auricle, and partly through the arterial canal, being a short passage to the aorta, and thence to every part of the body, maintaining the circulation: but, upon rising to come ashore, the blood finds its passage again through the lungs the moment he respire.

Thus the fœtus * in utero, during his confinement, having the lungs compressed, and consequently the pulmonary arteries and veins impervious, has the circulation of the blood carried on through the oval hole and the arterial canal. Now, so far the phoca in the water, and the fœtus in utero, are analogous; but they differ in other material circumstances. One is, that the fœtus, having never respired, remains sufficiently nourished by the maternal blood circulating through him, and continues to grow till the time of his birth, without any want of respiration during nine months confinement: the phoca, having respired the moment of his birth, cannot live very long without it, for the reasons given before; and this hole and canal would be closed in them, as it is in land-animals, if the dam did not, soon after the birth of the cub, carry him to very frequently into the water to teach him; by which practice these passages are kept open during life, otherwise they would not be capable of attaining the food designed for them by Providence.

Another difference is, that the phoca, as was said before, would be relaxed by maceration in remaining too long in the water; whereas the fœtus in utero suffers no injury from continuing its full number of months in the fluid it swims in: the reason is, that water is a powerful solvent, and penetrates the pores of the skins of land-animals, and in time can dissolve them; whereas the *liquor amnii* is an insipid soft fluid, impregnated with particles more or less mucilaginous, and utterly incapable of making the least alteration in the cutis of the fœtus.

Otters, beavers, and some kinds of rats, go occasionally into the water for their prey, but cannot remain very long under water. “I have often gone to shoot otters,” (says our author), and watched all their motions: I have seen one of them go softly from a bank into the river, and dive down; and in about two minutes rise, at ten or fifteen yards from the place he went in, with a middling salmon in his mouth, which he brought on shore: I shot him, and saved the fish whole.” Now, as all fœtuses have these passages open, if a whelp of a true water-spaniel was, immediately after its birth, served as the phoca does her cubs, and immersed in water, to stop respiration for a little time every day, it is probable that the hole and canal would be kept open, and the dog be made capable of remaining as long under water as the phoca.

Frogs, how capable soever of remaining in the water, yet cannot avoid living on land, for they respire; and

Amphibia.

* See Fœtus.

Amphibia.

and if a frog be thrown into a river, he makes to the shore as fast as he can.

† See Lacer-
ia.

The lizard kind, such as may be called water-lizards †, are all obliged to come to land, in order to deposit their eggs, to rest, and to sleep. Even the crocodiles, who dwell much in rivers, sleep and lay their eggs on shore; and, while in the water, are compelled to rise to the surface to breathe: yet, from the texture of his scaly covering, he is capable of remaining in the water longer by far than any species of the phoca, whose skin is analogous to that of a horse or cow.

* See Hippo-
potamus.

The hippopotamus *, who wades into the lakes or rivers, is a quadruped, and remains under the water a considerable time; yet his chief residence is upon land, and he must come on shore for respiration.

‡ See Testu-
da.

The testudo, or sea-tortoise ‡, though he goes out to sea and is often found far from land; yet being a respiring animal, cannot remain long under water. He has indeed a power of rendering himself specifically heavier or lighter than the water, and therefore can let himself down to avoid an enemy or a storm: yet he is under a necessity of rising frequently to breathe, for reasons given before; and his most usual situation, while at sea, is upon the surface of the water, feeding upon the various substances that float in great abundance every where about him; these animals sleep securely upon the surface, but not under water; and can remain longer at sea than any other of this class, except the crocodile, because, as it is with the latter, his covering is not in danger of being too much macerated; yet they must go on shore to copulate and lay their eggs.

2. The consideration of these is sufficient to inform us of the nature of the first order of the class of amphibious animals; let us now see what is to be said of the second in our division of them, which are such as chiefly inhabit the waters, but occasionally go on shore.

These are but of two kinds: the eels, and water serpents or snakes of every kind. It is their form that qualifies them for loco-motion on land, and they know their way back to the water at will; for by their structure they have a strong peristaltic motion, by which they can go forward at a pretty good rate: whereas all other kinds of fish, whether vertical or horizontal, are incapable of a voluntary loco-motion on shore; and therefore, as soon as such fish are brought out of the water, after having floundered a while, they lie motionless, and soon die.

Let us now examine into the reason why these vermicular fish, the eel and serpent kind, can live a considerable time on land, and the vertical and horizontal kinds die almost immediately when taken out of the water: and, in this research, we shall come to know what analogy there is between land animals and those of the waters. All land-animals have lungs, and can live no longer than while these are inflated by the ambient air, and alternately compressed for its expulsion; that is, while respiration is duly carried on, by a regular inspiration and expiration of air.

In like manner, the fish in general have, instead of lungs, gills or branchiæ: and as in land-animals the lungs have a large portion of the mass of blood circulating through them, which must be stopped if the air has not a free ingress and egress into and from them; so, in fish, there is a great number of blood-vessels that pass through the branchiæ, and a great portion of their

blood circulates through them, which must in like manner be totally stopped, if the branchiæ are not perpetually wet with water. So that, as the air is to the lungs in land-animals a constant assistant to the circulation; so is the water to the branchiæ of those of the rivers and seas: for when these are out of the water, the branchiæ very soon grow crisp and dry, the blood-vessels are shrunk, and the blood is obstructed in its passage; so, when the former are immersed in water, or otherwise prevented from having respiration, the circulation ceases, and the animal dies.

Again, as land-animals would be destroyed by too much maceration in water; so fishes would, on the other hand, be ruined by too much excruciation; the latter being, from their general structure and constitution, made fit to bear, and live in, the water; the former, by their constitution and form, to breathe and dwell in the air.

But it may be asked, why eels and water-snakes are capable of living longer in the air than the other kinds of fish? This is answered, by considering the providential care of the great Creator for these and every one of his creatures: for, since they were capable of loco-motion by their form, which they need not be if they were never to go on shore, it seemed necessary that they should be rendered capable of living a considerable time on shore, otherwise their loco-motion would be in vain. How is this provided for? Why, in a most convenient manner: for this order of fishes have their branchiæ well covered from the external drying air; they are also furnished with a slimy mucus, which hinders their becoming crisp and dry for many hours; and their very skins always emit a mucous liquor, which keeps them supple and moist for a long time: whereas the branchiæ of other kinds of fish are much exposed to the air, and want the slimy matter to keep them moist. Now, if any of these, when brought out of the water, were laid in a vessel without water, they might be preserved alive a considerable time, by only keeping the gills and surface of the skin constantly wet, even without any water to swim in."

It has been advanced, that *man* may, by art, be rendered amphibious, and able to live under water as well as frogs. As the fœtus lives *in utero* without air, and the circulation is there continued by means of the foramen ovale; by preserving the passage open, and the other parts *in statu quo*, after the birth, the same faculty would still continue. Now, the foramen, it is alleged, would be preserved in its open state, were people accustomed, from their infancy, to hold their breath a considerable time once a day, that the blood might be forced to resume its pristine passage, and prevent its drying up as it usually does. This conjecture seems, in some measure, supported by the practice of divers, who are taught from their childhood to hold their breath, and keep long under water, by which means the ancient channel is kept open.—A Calabrian monk at Madrid laid claim to this amphibious capacity, making an offer to the king of Spain, to continue twice twenty-four hours under water, without ever coming up to take breath. Kircher gives an account of a Sicilian, named the *fish Colas*; who, by a long habitude from his youth, had so accustomed himself to live in water, that his nature seemed to be quite altered; so that he lived rather after the manner of a fish than a man.

AMPHIBOLOGY, in grammar and rhetoric, a term

Amphibia.

Amphit-
chys
Amphi-
tyons.

term used to denote a phrase susceptible of two different interpretations. Amphibology arises from the order of the phrase, rather than from the ambiguous meaning of a word.

AMPHIBRACHYS, in ancient poetry, the name of a foot consisting of three syllables, whereof that in the middle is long, and the other two short; such is the word [ábrê].

AMPHICOME, in natural history, a kind of figured stone, of a round shape, but rugged, and beset with eminences, celebrated on account of its use in divination. The word is originally Greek, ἀμφικόμε, *g. d. utrinque comata*, or hairy on all sides. This stone is also called *Ératylos*, *Egulus*, *Amatoria*, probably on account of its supposed power of creating love. The amphicome is mentioned by Democritus and Pliny, tho' little known among the moderns. Mercatus takes it for the same with the *lapis lumbricatus*, of which he gives a figure.

AMPHICTYONS, in Grecian antiquity, an assembly composed of deputies from the different states of Greece; and resembling in some measure, the diet of the German empire.—Some suppose the word ἀμφικτύονες to be formed of ἀμφί, about, and τύον, or κλύον, in regard the inhabitants of the country round about met here in council: others, with more probability, from *Amphictyon*, son of Deucalion, whom they suppose to have been the founder of this assembly; though others will have Acrisius, king of the Argives, to have been the first who gave a form and laws to it.

Authors give different accounts of the number of the Amphictyons, as well as of the states who were entitled to have their representatives in this council. According to Strabo, Harpocration, and Suidas, they were twelve from their first institution, sent by the following cities and states; the Ionians, Dorians, Peræthians, Boeotians, Magnesiens, Acheans, Phthians, Melians, Dolopians, Ænians, Delphians, and Phocians. Æschines reckons no more than eleven; instead of the Acheans, Ænians, Delphians, and Dolopians, he only gives the Thessalians, Oetians, and Locrians. Lastly, Pausanias's list contains only ten, *viz.* the Ionians, Dolopians, Thessalians, Ænians, Magnesiens, Melians, Phthians, Dorians, Phocians, and Locrians.

In the time of Philip of Macedon, the Phocians were excluded the alliance, for having plundered the Delphian temple, and the Lacedæmonians were admitted in their place; but the Phocians, 60 years after, having behaved gallantly against Brennus and his Gauls, were restored to their seat in the Amphictyonic council. Under Augustus, the city Nicopolis was admitted into the body; and to make room for it, the Magnesiens, Melians, Phthians, and Ænians, who till then had distinct voices, were ordered to be numbered with the Thessalians, and to have only one common representative. Strabo speaks as if this council were extinct in the times of Augustus and Tiberius: but Pausanias, who lived many years after, under Antoninus Pius, assures us it remained entire in his time, and that the number of Amphictyons was then thirty.

The members were of two kinds. Each city sent two deputies, under different denominations; one called *ἱερεὺς*, whose business seems to have been more immediately to inspect what related to sacrifices and cere-

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monies of religion; the other *πολεμάρχης*, charged with hearing and deciding of causes and differences between private persons. Both had an equal right to deliberate and vote, in all that related to the common interests of Greece. The *hieromnemon* was elected by lot; the *pylagoræ* by plurality of voices.

Tho' the Amphictyons were first instituted at Thermopylæ, M. de Valois maintains, that their first place of residence was at Delphi; where, for some ages, the tranquillity of the times found them no other employment than that of being, if we may so call it, churchwards of the temple of Apollo. In after-times, the approach of armies frequently drove them to Thermopylæ, where they took their station, to be nearer at hand to oppose the enemies progress, and order timely succour to the cities in danger. Their ordinary residence, however, was at Delphi.

Here they decided all public differences and disputes between any of the cities of Greece; but before they entered on business, they jointly sacrificed an ox cut into small pieces, as a symbol of their union. Their determinations were received with the greatest veneration, and even held sacred and inviolable.

The Amphictyons, at their admission, took a solemn oath never to divert any city of their right of deputation; never to avert its running waters; and if any attempts of this kind were made by others, to make mortal war against them: more particularly, in case of any attempt to rob the temple of any of its ornaments, that they would employ hands, feet, tongue, their whole power, to revenge it.—This oath was backed with terrible imprecations against such as should violate it; *e. gr.* May they meet all the vengeance of Apollo, Diana, Minerva, &c. their soil produce no fruit, their wives bring forth nothing but monsters, &c.

The stated terms of their meeting was in spring and autumn; the spring meeting was called *ἑαρινὴ σύνοδος*, that in autumn *κλειραγία*. On extraordinary occasions, however, they met at any time of the year, or even continued sitting all the year round.

Philip of Macedon usurped the right of presiding in the assembly of the Amphictyons, and of first consulting the oracle which was called *Προμαντία*.

AMPHIDROMIA, a feast celebrated by the ancients on the fifth day after the birth of a child.

AMPHIDRYON, in ecclesiastical writers, denotes the veil or curtain which was drawn before the door of the bema in ancient churches.

AMPHILOCHIA, the territory of the city of Argos in Acarnania; *Amphilochium*, (Thucydides); called *Amphilochi* (from the people,) in the lower age, (Stephanus.) A town also of Spain, in Galicia, built by Teucer, and denominated from Amphilochus one of his companions, (Strabo:) now *Orense*. W. long. 8. 20. lat. 42. 36.

AMPHILOCHIUS, bishop of Iconium, in the fourth century, was the friend of St Gregory Nazianzen and St Basil. He assisted at the first general council of Constantinople in 381; presided at the council of Side; and was a strenuous opposer of the Arians. He died in 394; and his works were published in Greek and Latin, at Paris 1644, by Francis Combes.

AMPHILOCHUS, son of Amphiarus and Eriphyle, was a celebrated diviner. He had an altar erected to him at Athens, and an oracle at Mallus in Cilicia,

R r

Amphic-
tyons
Amphilo-
chius.

Amphi-
macer
||
Amphib-
æna.

licia, which city was founded by him and Mopsus. The answers of this oracle were given by dreams; the party inquiring used to pass a night in the temple, and that night's dream was the answer. Dion Cassius mentions a picture done by order of Sextus Condranus, representing the answer he received of the oracle, in the reign of the emperor Commodus.

AMPHIMACER, in ancient poetry, a foot consisting of three syllables, whereof the first and last are long, and that in the middle short; such is the word [Cāstīās.]

AMPHION, son of Jupiter and Antiope; who, according to the poets, made the rocks follow his music; and at his harp the stones of Thebes danced into walls and a regular city.

AMPHIPOLES, in antiquity, the principal magistratus of Syracuse. They were established by Timoleon in the 109th Olympiad, after the expulsion of the tyrant Dionysius. They governed Syracuse for the space of 300 years: and Diodorus Siculus assures us, that they subsisted in his time.

AMPHIPOLIS, a city of Macedonia, an Athenian colony, on the Strymon, but on which side is not so certain: Pliny places it in Macedonia, on this side; but Scylax, in Thrace, on the other. The name of the town, *Amphipolis*, however, seems to reconcile their difference; because, as Thucydides observes, it was washed on two sides by the Strymon, which dividing itself into two channels, the city stood in the middle, and on the side towards the sea there was a wall built from channel to channel. Its ancient name was *Ennea oroi*, the *Nine Ways*, (Thucydides, Herodotus.) The citizens were called *Amphipolitani*, (Livy.) It was afterwards called *Christopolis*; now *Christopoli*, or *Chisopoli*, (Hollænius.)

AMPHIPOLIS, a town of Syria, on the Euphrates, built by Seleucus, called by the Syrians *Turmeda*, (Stephanus): the same with *Thapfacus*, (Pliny); and supposed to have been only renewed and adorned by Seleucus, because long famous before his time, (Xenophon.)

AMPHIPPII, in Grecian antiquity, soldiers who, in war, used two horses without saddles, and were dexterous enough to leap from one to the other.

AMPHIPRORÆ, in the naval affairs of the ancients, vessels with a prow at each end. They were used chiefly in rapid rivers and narrow channels, where it was not easy to tack about.

AMPHIPROSTYLE, in the architecture of the ancients, a temple which had four columns in the front, and as many in the aspect behind.

AMPHIBÆNA, in zoology, a genus of serpents belonging to the order of amphibia serpentes, so called from the false notion of its having two heads, because it moves with either end foremost.

The head of the amphibæna is small, smooth, and blunt; the nostrils are very small; the eyes are minute and blackish; and the mouth is furnished with a great number of small teeth. The body is cylindrical, about a foot long, and divided into about 200 annular convex segments like those of a worm; and it has about 40 longitudinal streaks, of which 12 on each side are in the form of small crosses like the Roman X; the anus is a transverse slit; and the last ring or segment of the belly has eight small papillæ, forming a transverse line

before the anus; the tail, *i. e.* all the space below the anus, is short, consisting of thirty annular segments, without being marked with the cross-lines, and is thick and blunt at the point. The colour of the whole animal is black, variegated with white; but the black prevails most on the back, and the white on the belly. It has a great resemblance to a worm, living in the earth, and moving equally well with either end foremost. There are but two species, *viz.* 1. The fuliginosa, which answers exactly to the above description, and is found in Libya and in different parts of America. 2. The alba, which is totally white, is a native of both the Indies, and is generally found in ant-hillocks. The bite of the amphibæna is reckoned to be mortal by many authors; but as it is not furnished with dog-fangs, the usual instruments of conveying the poison of serpents, later writers esteem it not to be poisonous. They feed upon ants and earth-worms, but particularly the latter. See Plate XI. fig. 2.

AMPHISCII, among geographers, a name applied to the people who inhabit the torrid zone. The Amphiscii, as the word imports, have their shadows one part of the year towards the north, and the other towards the south, according to the sun's place in the ecliptic. They are also called *Afcii*. See ASCII.

AMPHISSA, the capital of the Locri Oxiæ, one hundred and twenty stadia (or 15 miles) to the west of Delphi, (Pausanias.) So called, because surrounded on all hands by mountains, (Stephanus.) Hence *Amphissæi*, the inhabitants; who plundered the temple at Delphi, (Demofthenes.)—Also a town of Magna Græcia, at the mouth of the Sagra, on the coast of the Farther Calabria, situated between Locri and Caulonia; now called *Rocella*. *Amphissus* the epithet, (Ovid.)

AMPHITANE, among ancient naturalists, a stone said to attract gold, as the loadstone does iron. Pliny says it was found in that part of the Indies where the native gold lay so near the surface of the earth as to be turned up in small masses, among the earth of ant-hills; and describes it to have been of a square figure, and of the colour and brightness of gold. The description plainly points out a well-known fossil, called, by Dr Hill, *pyricubium*: this is common in the mines of most parts of the world; but neither this nor any other stone was ever supposed, in our times, to have the power of attracting gold.

AMPHITHEATRE, in antiquity, a spacious edifice, built either round or oval, with a number of rising seats, upon which the people used to behold the combats of gladiators, of wild beasts, and other sports.

Amphitheatres were at first only of wood; and it was not till the reign of Augustus, that Statilius Taurus built one, for the first time, of stone. The lowest part was of an oval figure, and called *arena*, because, for the convenience of the combatants, it was usually strewn with sand; and round the arena were vaults styled *caveæ*, in which were confined the wild beasts appointed for the shows.

Above the caveæ was erected a large circular peristyle, or podium, adorned with columns. This was the place of the emperors, senators, and other persons of distinction.

The rows of benches were above the podium. Their figure was circular; and they were entered by avenues, at the end of which were gates called *vomitoria*.

The

Amphif-
bæna
||
Amphithe-
atre.

Fig. 2.
AMPHISBENA



Fig. 3.
ANAS ARBOREA or Whistling Duck



A. Bell. Sculp.

Amphitrite
||
Amplitude.

The most perfect remains we now have of amphitheatres, are that of Vespasian called the *coliseum*, that at Verona in Italy, and that at Nîmes in Languedoc. AMPHITRITE, daughter of Oceanus and Doris, and wife to Neptune.

AMPHITRYON, son of Alcæus, less known by his own exploits than from his wife Alcmena's adventure. See ALCMENA.

AMPHORA, in antiquity, a liquid measure among the Greeks and Romans. The Roman amphora contained forty-eight sextaries, and was equal to about seven gallons one pint English wine-measure; and the Grecian or Attic amphora contained one third more.

AMPHORA, was also a dry measure used by the Romans, and contained about three bushels.

AMPHORA, among the Venetians, is the largest measure for liquids, containing about 16 quarts.

AMPHORARIUM VINUM, in antiquity, denotes that which is drawn or poured into *amphore*, or pitchers; by way of distinction from *vinum doliare*, or cask wine.—The Romans had a method of keeping wine in *amphore* for many years to ripen, by fastening the lids tight down with pitch or gypsum, and placing them either in a place where the smoke came, or under ground.

AMPHOTIDES, in antiquity, a kind of armour or covering for the ears, worn by the ancient pugiles, to prevent their adversaries from laying hold of that part.

AMPHTHILL, a town in Bedfordshire, seated pleasantly between two hills, but in a barren soil. W. Long. o. 20. N. Lat. 52. 2.

AMPLIATION, in a general sense, denotes the act of enlarging or extending the compass of a thing.

On a medal of the emperor Antoninus Pius, we find the title *Ampliator civium* given him, on account of his having extended the *jus civitatis*, or right of citizenship, to many states and people before excluded from that privilege. In effect, it is generally supposed to have been this prince that made the famous constitution, whereby all the subjects of the empire were made citizens of Rome.

AMPLIATION, in Roman antiquity, was the deferring to pass sentence in certain causes. This the judge did, by pronouncing the word *amplius*; or by writing the letters N. L. for *non liquet*; thereby signifying, that, as the cause was not clear, it would be necessary to bring further evidence.

AMPLIFICATION, in rhetoric. See EXAGGERATION.

AMPLITUDE, in astronomy, an arch of the horizon intercepted between the east or west point, and the centre of the sun, or a planet, at its rising or setting; and so is either north and south, or ortive and occative.

MAGNETICAL AMPLITUDE, the different rising or setting of the sun from the east or west points of the compass. It is found by observing the sun, at his rising and setting, by an amplitude-compass.

AMPSAGA, a river of ancient Numidia *.

AMPSANCTI VALLIS, or AMPSANCTI LACUS, a cave or lake in the heart of the Hirpini, or Principato Ultra, near the city Tricento, (Cicero, Virgil, Pliny;) it is now called *Musiti*, from Mephitis, the goddess of stench, who had a temple there. The ancient

poets imagined that this gulf led to hell. It is also called *Anfanti*.

AMPULLA, in antiquity, a round big-bellied vessel which the ancients used in their baths, to contain oil for anointing their bodies.—Also the name of a cup for drinking out of at a table.

AMPURA, a province of the kingdom of Peru, before its conquest by the Spaniards. Here the inhabitants worshipped two lofty mountains from a principle of gratitude, because of the descent of the water from them by which their lands were fertilized. It is said to have been conquered by Virachoca the 8th inca.

AMPURIAS, the capital of the territory of Ampurdan, in Catalonia, seated at the mouth of the river Fluvia, in E. Long. 2. 56. N. Lat. 42. 5. The land about it is barren, full of briars and bulrushes, except in some places, which produce flax.

AMPUTATION, in surgery, the cutting off a limb, or any part, from the body *.

AMRAS, a strong castle of Germany, seated in Tirol. E. Long. 11. 40. N. Lat. 47. 0. It is full of rarities of every kind; and has a library, with the portraits of many learned men.

AMSBURY, or AMBERSBURY, a town in Wiltshire, lying in W. Long. 1. 20. N. Lat. 51. 29. It is the *Pagus Ambri*, famous for a monastery built by one Ambrus, and afterwards for a nunnery of noble women. There is a nobleman's seat here, built by Inigo Jones, to which new works were added under the direction of Lord Burlington. It is 80 miles west of London, and six miles north of Salisbury.

AMSDORFIANS, in church-history, a sect of Protestants in the XVIth century, who took their name from Amstdorf their leader. They maintained, that good works were not only unprofitable, but were obstacles to salvation.

AMSTERDAM, the capital city of the province of Holland and of the United Netherlands, is seated on the river Amstel and an arm of the sea called the *Wye*. The air is but indifferent, on account of the marshes that surround it, and render the city almost inaccessible: but this inconvenience is abundantly recompensed by the utility of its commerce, which the port serves greatly to promote; for it will contain above a thousand large ships.

In 1204, it was nothing but a small castle, called *Amstel* from the name of the river, which its lords made a retreat for fishermen, who at first lived in huts covered with thatch: but it soon became considerable, and had a bridge and towers built about it, inasmuch that it rose to a small city; though, till the year 1490, it was surrounded with nothing but a weak palisado. The walls were then built with brick, to defend it from the incursions of the inhabitants of Utrecht, with whom the Hosianders were often quarrelling; but some months afterwards it was almost reduced to ashes. In 1512, it was besieged by the people of Guelderland; who, not being able to take it, set fire to the ships in the harbour. In 1525, an Anabaptist leader, with 600 of his followers, got into the city in the night-time, attacked the town-house, and defeated those that made any resistance. At length they barricaded, with wood and hop-sacks, the avenues to the market-place, where these enthusiasts were posted; and so put a stop to their fury till day appeared, at which time the citizens fell

Ampulla
||
Amstdam.

* See Surge-
ry, n^o 18,
39.

* See Al-
giers, n^o 59.

Amster-
dam.

upon them on all sides, and forced them to retire into the town-house, where most of them were cut to pieces. About ten years after, there was another tumult raised by a parcel of fanatics, consisting of men and women, who ran about the streets stark naked, and had a design of making themselves masters of the town-house. Their shrieks and cries, which were dreadful enough, soon alarmed the inhabitants, who seized the greatest part of them, and gave them the chastisement they deserved.

Amsterdam was one of the last cities that embraced the reformed religion. It was besieged by the Hollanders in 1578, and submitted after a siege of ten months. One article of the capitulation was, a free exercise of the Roman-catholic religion: but this was not observed by the Protestants; for they soon drove the ecclesiastics, monks, and nuns, out of the city, broke the images, and demolished the altars. From this time it became the general rendezvous of all nations and of every sect, which raised it to that degree of grandeur and opulence it now enjoys. The inhabitants were often obliged to enlarge the bounds of their city, and in 1675 it was increased to its present extent. It was surrounded with a brick wall, and a large ditch, 80 feet broad, full of running water. The walls were fortified with 26 bastions, on each of which there is now a windmill. There are eight gates towards the land, and one towards the water.

Amsterdam being seated in a marshy soil, is built on piles of wood, for which reason no coaches are allowed, except to great men and physicians, who pay a tax for that privilege; and all kinds of goods are drawn on sledges. It stands so low, that they would be exposed to inundations, if they did not secure themselves by dikes and sluices. The finest streets are, the Keyfar's Graft, or Emperor's Canal; the Heer Graft, or Lords Canal; the Cingel; and the street of Haerlem. The principal canal is remarkable for its houses, which are magnificent structures, of an equal height. Here are three prodigious sluices, and a great number of canals, which cross the city in many parts, and render the streets clean and pleasant. The canals are deep, their sides are lined with hewn stone, they have generally rows of trees planted on each side, and many stone-bridges over different parts of them.

The finest is that called the *Ammarack*, which is formed by the waters of the Amstel, into which the tide comes up, and on the sides of which are two large quays. This canal has several bridges. The principal is that next the sea, called *Pont-Neuf*, or the *New Bridge*: it is 660 feet long, and 70 broad, with iron balustrades on each side; it has 36 arches, of which 17 are very high, and eight are shut up to inclose the yachts. From this bridge there is a most charming prospect of the city, port, and sea. The port is a mile and half in length, and above a thousand paces in breadth: it is always filled with a multitude of vessels, which look like a forest, or rather a floating city. The streets in general are well paved, and the houses built of brick or stone. Towards the sides of the haven, the city is inclosed with great poles driven into the ground, which are joined by large beams placed horizontally. There are openings to let the ships in and out, which are shut every night at the ringing of a bell. Amsterdam is computed to be half as big as

London; and the number of houses are said to amount to 26,035.

The public buildings are very magnificent. The *stadthoufe* was founded in 1648; it is built upon 14,000 wooden piles; and its front is 282 feet long, its sides 255 feet, and its height to the roof 116. There is a marble pediment in the front, whereon a woman is carved in relief, holding the arms of the city; she is seated in a chair, supported by two lions, with an olive-branch in her right hand; on each side are four Naiads, who present her with a crown of palm and laurel, and two other marine goddesses present her with different sorts of fruit; besides, there is Neptune with his trident, accompanied with Tritons, a sea-unicorn, and a sea-horse. On the top stand three statues in bronze, representing Justice, Strength, and Plenty. On the top of the structure is a round tower, 50 feet above the roof, adorned with statues, and an harmonious chime of bells, the biggest of which weighs about 7000 pounds, and the next 6000; they are made to play different tunes every month. It has not one handsome gate, but only seven doors to answer to the number of the United provinces. On the floor of the great hall are two globes, the celestial and terrestrial, which are 22 feet in diameter, and 69 in circumference; they are made of black and white marble, and are inlaid with jasper and copper. In general, all the chambers are enriched with paintings, carvings, and gildings. While this *stadthoufe* was building, the old one was set on fire, and consumed with all the archives and registers.

Under the *stadthoufe* is a prodigious vault, wherein is kept the bank of Amsterdam, where there is vast quantity of ingots both of gold and silver, as also bags, which are supposed to be full of money. The doors are proof against petards, and are never opened but in the presence of one of the burgo-masters. The prisons for debtors and criminals are likewise under the *stadthoufe*; as also the guard-room for the citizens, wherein the keys of the city are locked every night. At the end of the great hall is the *schepens* or aldermen's chamber, where civil causes are tried. Besides these, there are the chambers of the senate and council, the burgo-master's chamber, the chambers of accounts, &c. In the second story is a large magazine of arms; and on the top of the building are six large cisterns of water, which may be conveyed to any room in the house in case of fire, to prevent which the chimneys are lined with copper.

The bourse, or exchange, where the merchants assemble, is all of free-stone, and built upon two thousand wooden piles; its length is about two hundred feet, and its breadth one hundred and twenty-four; the galleries are supported by twenty-six marble columns, upon each of which are the names of the people that are to meet there; they are all numbered, and there is a place fixed for every merchandise under some one of these numbers. On the right hand of the gate is a superb staircase, which leads to the galleries, on one side of which there are several shops, and on the other a place to sell clothes. It is not unlike the royal exchange in London.

The house belonging to the East-India company contains large magazines, full of the different sorts of commodities brought from the East-Indies. The building was formerly used for the city arsenal. There are

Amster-
dam.

Amster-
dam.

are several magnificent new buildings added to it. The directors hold their assemblies there twice a-week.

The academy called the *Illustrious School*, is likewise a very fine building: it was formerly a convent belonging to the nuns of St Agnes. Here they teach Latin, the oriental languages, theology, philosophy, history, &c. The lawyers and physicians have likewise their schools. There are eleven churches belonging to the established religion, and one for English Presbyterians, none besides which are allowed to have bells. Other sects may have churches, except the Roman-catholics, who meet in private houses without molestation. The Jews have two fine synagogues, one for the Portuguese, and the other for the Germans. Some of the churches are very stately buildings, but not so remarkable as to deserve a particular description.

Besides these, there are several hospitals, or houses for orphans, for poor widows, for sick persons, and for mad people; all which are regulated with much prudence. The *Rasp-House*, which was formerly a nunnery, is now a sort of a work-house for men that behave ill. They are commonly set to saw or rasp Brazil wood; and if they will not perform their task, they are put into a cellar which the water runs into, where if they do not almost constantly ply the pump, they run the risk of being drowned. There is likewise a spin-house for debauched women, where they are obliged to spin wool, flax, and hemp, and do other work. All the hospitals are extremely neat, and richly adorned with pictures. They are maintained partly by voluntary contributions, which are raised by putting money into the poor's-boxes fixed up all over the city; and partly by taxing all public diversions, as well at fairs as elsewhere. Likewise every person that passes thro' any of the gates at candle-light pays a penny for the same uses. These charities are taken care of by certain officers called *deacons*. The governors are nominated by the magistrates out of the most considerable men in the city.

The common sort have places of diversion called *Spiel-Houses*, where there are music and dancing. They are much of the same kind as the hops which were so frequent about London. If strangers go there, they must take care not to make their addresses to a woman that is engaged to any other man.

This city is governed by a senate or council, which consists of 36 persons, called a *Vroedchap*, who enjoy their places for life; and when any of them dies, the remainder chuse another in his stead. This senate elects deputies to be sent to the States of Holland, and appoints the chief magistrates of the city, called *Burgomasters*, or *Becevens*, who are like our aldermen. The number is twelve, out of which four are chosen every year to execute the office, and are called *Burgomasters-regent*. Three of these are discharged every year, to make room for three others. One of the four is kept in to inform the new ones of the state of affairs, and also presides the three first months in the year, and the others three months each; so that, when they are in this office, they may be compared to the lord-mayor of the city of London. These alterations and appointments are made by their own body. They dispose of all inferior offices which become vacant during their regency. They have likewise the direction of all public works, which regard the safety, tranquillity, and embellish-

ment of the city. The keys of the famous bank of this city are in the hands of these magistrates.

The college consists of new burgomasters or echevins, who are judges in all criminal affairs, without appeal; but in civil causes they may appeal to the council of the province. There are two treasurers, a bailiff, and a pensionary. The bailiff continues in his office three years; and searches after criminals, takes care to prosecute them, and sees their sentence executed. The pensionary is the minister of the magistracy, is well versed in the laws, makes public harangues, and is the defender of the interests of the city. The city of Amsterdam contributes to the public income above 50,000 livres per day, besides the excise of beer, flesh, and corn; which in all amounts to above one million six hundred thousand pounds sterling a-year. This is more than is paid by all the rest of the provinces put together; and yet Amsterdam bears but the fifth rank in the assembly of the states of Holland, with this distinction, that whereas other cities send two members, this sends four.

The militia of Amsterdam is very considerable; they have sixty companies, each of which has from 200 to 300 men. Jews and Anabaptists are excluded from this service, not being admitted to bear arms. But they are obliged to contribute to the maintenance of the city-guard, which consists of 1400 soldiers; as also to the night-watch, who patrol about the streets, and proclaim the hour. Besides these, there are trumpeters on every church steeple, who sound every half hour; and if there happens a fire, they ring the fire-bell, and show where it is. The inhabitants have excellent contrivances to extinguish it speedily.

The trade of Amsterdam is prodigious: for almost the whole trade of the East-India company centres in this city, which besides carries on a commerce with all the rest of the world, inasmuch that it may be called the magazine or store-house of Europe. They import a vast deal of corn from the Baltic, not so much for present consumption, as to lay up against times of scarcity. The richest spices are entirely in the hands of the East-India company, who furnish all Europe therewith. They have vast quantities of military stores, with which they supply several nations; which is owing to their engrossing most of the iron works on the Rhine and other great rivers that run into Holland. The longitude of Amsterdam is 4.30. E.; the latitude, 52.25. N.

AMSTERDAM, is also the name of an island in the south-sea, said to have been discovered by Tasman a Dutch navigator, but not taken notice of in our later discoveries.

AMULET, a charm, or preservative against mischief, witchcraft, or diseases.

Amulets were made of stone, metal, simples, animals, and in a word of every thing that imagination suggested.

Sometimes they consisted of words, characters, and sentences, ranged in a particular order, and engraved upon wood, &c. and worn about the neck, or some other part of the body.*

At other times they were neither written nor engraved; but prepared with many superstitious ceremonies, great regard being usually paid to the influence of the stars. The Arabians have given to this species of amulet the name of *talisman*†.

All nations have been fond of amulets: the Jews man-
were

Amster-
dam.

Amulet.

* See Abra-
cadabra.† See Talis-
man.

Amulet,
Amurat.

were extremely superstitious in the use of them, to drive away diseases; and the Misna forbids them, unless received from an approved man who had cured at least three persons before by the same means.

Among the Christians of the early times, amulets were made of the wood of the cross, or ribbands with a text of scripture written in them, as preservatives against diseases. Notwithstanding the progress of learning and refinement, there is not any country in Europe, even at this day, who do not believe in some charm or other. The pope is supposed to have the virtue of making amulets, which he exercises in the consecrating of *Agnus Dei's*, &c. The sponge which was wiped his table, was formerly in great veneration on this account, as a preservative from wounds, and death itself: on this account it was sent with great solemnity by Gregory II. to the duke of Aquitaine.

§ See *Agnus Dei*.

AMURAT, or AMURATH, I. the fourth emperor of the Turks, and one of the greatest princes of the Ottoman empire, succeeded Soliman in 1360. He took from the Greeks Gallipoli, Thrace, and Adrianople, which last he chose for the place of his residence. He defeated the prince of Bulgaria, conquered Misnia, chastised his rebellious bashaws, and is said to have gained 36 battles. This prince, in order to form a body of devoted troops that might serve as the immediate guards of his person and dignity, appointed his officers to seize annually, as the imperial property, the fifth part of the Christian youth taken in war. These, after being instructed in the Mahometan religion, inured to obedience by severe discipline, and trained to warlike exercises, were formed into a body distinguished by the name of *Janissaries*, or *New Soldiers*. Every sentiment which enthusiasm can inspire, every mark of distinction that the favour of the prince could confer, were employed in order to animate this body with martial ardour, and with a consciousness of its own pre-eminence. The Janissaries soon became the chief strength and pride of the Ottoman armies, and were distinguished above all the troops whose duty it was to attend on the person of the sultan.—At length the death of Lazarus, despot of Servia, who had endeavoured in vain to stop the progress of Amurath's arms, touched Milo, one of his servants, in so sensible a manner, that, in revenge, he stabbed the sultan in the midst of his troops, and killed him upon the spot, A. D. 1389, after he had reigned 23 years.

AMURAT II. the 10th emperor of the Turks, was the eldest son of Mahomet I. and succeeded his father in 1421. He besieged Constantinople and Belgrade without success; but he took Thessalonica from the Venetians, and compelled the prince of Bosnia and John Caltriot prince of Albany to pay him tribute. He obliged the latter to send his three sons as hostages; among whom was George, celebrated in history by the name of *Scanderbeg*. John Huniades defeated Amurat's troops, and obliged him to make peace with the Christian princes, in 1442. These princes afterwards breaking the peace, Amurat defeated them in the famous battle of Varna, November 10th 1444, which proved so fatal to the Christians, and in which Ladislaus king of Hungary was killed. He afterwards defeated Huniades, and killed above 20,000 of his men; but George Caltriot, more known by the name of *Scanderbeg*, being re-established in the estates of

his father, defeated the Turks several times, and obliged Amurat to raise the siege of Croia, the capital of Albany. Amurat died, chagrined with his ill success, and infirm with age, February 11th 1451, at Adrianople. It is observed to this prince's honour, that he always kept his treaties with the greatest fidelity.

AMURCA, the name of an antiquated medicine, prepared by boiling the recrement or dregs of oil of olives to the consistence of honey, and used as an astringent.

AMYCLÆ, a city of Laconia, distant about 18 miles from the metropolis, founded by Amyclas the son of Lacedæmon, and famed afterwards for the birth of Castor and Pollux the sons of Tyndareus, eighth king of Sparta. It was afterwards famed for sending a considerable colony of its own inhabitants into Upper Calabria, who built there a city which they called by the same name. This last city was situated between Caieta and Terracina, and gave its name to the neighbouring sea. According to Pliny and Solinus, the territory of Amyclæ was so infested with vipers and other serpents, that the inhabitants were obliged to abandon their dwellings and settle elsewhere.—Among the ancient poets, the Amyclii, or inhabitants of this city, obtained the epithet of *taciti* or *silent*. The reason of this was, either because it was built by the Lacedæmonians, who, as they followed the doctrine of Pythagoras, were always inculcating the precept of silence, and thence called *taciti*; or because of a law which obtained in this place, forbidding any one, under severe penalties, to mention the approach of an enemy. Before this law was made, the city was daily alarmed by false reports, as the enemy had been already at the gates. From terrors of this kind the above-mentioned law indeed delivered them; but in the end it proved the ruin of the city: for the Dorians appearing unexpectedly under the walls, no one ventured to transgress the law; so that the city was easily taken. They reduced it to an inconsiderable hamlet; in which, however, were seen some of the remains of its ancient grandeur. One of the finest buildings that escaped the common ruin, was the temple and statue of Alexandra, whom the inhabitants pretended to be the same with Cassandra the daughter of Priam.

AMYGDALUS, the almond-tree; a genus of the monogynia order, belonging to the icosandria class of plants.—Linnæus classifies the perica or peach-tree along with the amygdalus; but for this, on account of the universally received distinction, we refer to the article *PERSICA*.

Species. 1. The communis, or common almond. This is cultivated more for the beauty of its flowers, than for its fruit. There are two varieties of this, one with sweet, the other with bitter kernels, which often arise from the fruit of the same tree. 2. The dulcis, or jordan-almond, has a tender shell, and a large sweet kernel. The leaves are broader, shorter, and grow much closer, than those of the common sort. The flowers are very small, and of a pale colour inclining to white. 3. The fativus, with narrow spear-shaped leaves. The flowers of this species are white, and much smaller than those of the common almond; its shoots are also smaller, and its joints closer; nor is the tree so hardy, and therefore it should have the advantage of a warm situation, otherwise it will not thrive. This sort flowers early in the spring,

Amurca
Amygdalus.

mygdalus, spring, but rarely bears fruit in Britain. 4. The orientalis, with spear-shaped silvery leaves, was found growing near Aleppo, from whence the fruit was sent to France, and thence into Britain. The leaves of the orientalis very much resemble sea-purslane. The flowers are very small, and are not succeeded by fruit in Britain. 5. The nana, or dwarf-almond, seldom rises more than three feet high, and sends out many side branches. The roots are very much subject to put out suckers, by which it may be increased in plenty; but if these are not annually taken away, they will starve the old plants. This species flowers in April, and makes a fine appearance.

Culture. See PERSICA.

Medicinal Uses. Sweet almonds are of greater use in food than as medicines: but they are reckoned to afford little nourishment; and, when eaten in substance, are not easy of digestion, unless thoroughly comminuted. They are supped, on account of their soft unctuous quality, to obtund acrimonious juices in the prime viæ: peeled sweet almonds, eaten six or eight at a time, sometimes give present relief in the heart-burn.

Bitter almonds have been found poisonous to dogs and sundry other animals; and a water distilled from them, when made of a certain degree of strength, has had like effects. Nevertheless, when eaten, they appear innocent to men, and have been not unfrequently used as medicines: Boerhaave recommends them, in substance, as diuretics which heat but moderately, and which may therefore be ventured upon in acute diseases.

The oils obtained by expression from both sorts of almonds are in their sensible qualities the same. The general virtues of these oils are, to blunt acrimonious humours, and to soften and relax the solids: hence their use, internally, in tickling coughs, heat of urine, pains, and inflammations; and, externally, in tension and rigidity of particular parts.

The milky solutions of almonds in watery liquors, commonly called *emulsions*, contain the oil of the subject, and participate in some degree of the emollient virtue thereof: but have this advantage above the pure oil, that they may be given in acute or inflammatory disorders, without danger of the ill effects which the oil might sometimes produce; since emulsions do not turn rancid or acrimonious by heat, as all the oils of this kind in a little time do. Several unctuous and resinous substances, of themselves not miscible with water, may by trituration with almonds be easily mixed with it into the form of an emulsion; and are thus excellently fitted for medicinal use. In this form, camphor and the resinous purgatives may be commodiously taken. See MATERIA MEDICA, [99.]

AMYRAULT (Moses), an eminent French Protestant divine, born at Bourgueil in Touraine in 1596. He studied at Saumur, where he was chosen professor of theology; and his learned works gained him the esteem of Catholics as well as Protestants, particularly of cardinal Richelieu, who consulted him on a plan of reuniting their churches, which, however, as may well be supposed, came to nothing. He published a piece in which he attempted to explain the mystery of predestination and grace, which occasioned a controversy between him and some other divines. He also wrote, An Apology for the Protestants; a Paraphrase on the

New Testament; and several other books. This eminent divine died in 1664.

AMYRBERIS in botany. See BERBERIS.

AMYRIS, a genus of the monogynia order, belonging to the decandria class of plants.—The most remarkable species are, 1. The elemifera, or shrub which bears the gum elemi, a native of America. It grows to the height of about six feet, producing trifoliated stiff shining leaves, growing opposite to one another on footstalks two inches long. At the ends of the branches grow four or five slender stalks set with many very small white flowers. 2. The opobalsamum is an ever-green shrub, growing spontaneously in Arabia, from whence the opobalsam, or balm of gilead, is procured. 3. Toxifera, or poison-wood, is a small tree, with a smooth light-coloured bark. Its leaves are winged; the middle rib is seven or eight inches long, with pairs of pinnae one against another on inch-long footstalks. The fruit hangs in bunches, is shaped like a pear, and is of a purple colour, covering an oblong hard stone. From the trunk of this tree distils a liquid as black as ink. Birds feed on the fruit; particularly one, called the *purple gros-beak*, on the mucilage that covers the stone. It grows usually on rocks, in Providence, Ithiera, and others of the Bahama islands. The other species of this plant mentioned by Linnaeus are, the *silvatica*, the *maritima*, *gileadensis*, *protium*, and *balsamifera*.

ANA, among physicians, denotes a quantity equal to that of the preceding ingredient. It is abbreviated thus, aa, or ã.

ANABOA, a small island situated near the coast of Loango in Africa, in E. Long. 9°. N. Lat. 1°. Here are several fertile valleys, which produce plenty of bananas, oranges, pine-apples, lemons, citrons, tamarinds, cocoa nuts, &c. together with vast quantities of cotton.—In this island are two high mountains, which, being continually covered with clouds, occasion frequent rains.

ANABAPTISTON, the same with ABAPTISTON.

ANABAPTISTS, a Protestant sect which sprung up in Germany immediately after the Reformation. It was founded in the year 1521, by Nicholas Storck, Mark Stubner, and Thomas Muncer; who had been followers of Luther, but abandoned him on pretence that his doctrine was imperfect. Storck being a man of no learning, boasted of inspirations; Stubner, who had wit and some learning, applied himself to find out suitable explications of the word of God; and Muncer, who was bold and zealous, played the enthusiast in the most extravagant manner.

The most remarkable of their religious tenets related to the sacrament of baptism; which, as they contended, ought to be administered only to persons grown up to years of understanding, and should be performed not by sprinkling them with water, but by dipping them in it: for this reason they condemned the baptism of infants; and, re-baptizing all whom they admitted into their society, the sect came to be distinguished by the name of *Anabaptists*. To this peculiar notion concerning baptism, which has the appearance of being founded on the practice of the church in the apostolic age, and contains nothing inconsistent with the peace and order of human society, they added other principles of a most enthusiastic as well as dangerous nature.

Amyrberis
Anabaptists.

Anabaptists.

ture. They maintained, that among Christians, who had the precepts of the gospel to direct and the spirit of God to guide them, the office of magistracy was not only unnecessary, but an unlawful encroachment on their spiritual liberty; that the distinctions occasioned by birth, or rank, or wealth, being contrary to the spirit of the gospel, which considers all men as equal, should be entirely abolished; that all Christians, throwing their possessions into one common stock, should live together in that state of equality which becomes members of the same family; that as neither the laws of nature, nor the precepts of the New Testament, had placed any restraints upon men with regard to the number of wives which they might marry, they should use that liberty which God himself had granted to the patriarchs.

By these doctrines they soon drew over vast numbers to their side; in so much that Muncer ventured openly to exhort the people to resist the magistrates, and constrain princes to divest themselves of their authority. Accordingly the peasants of Germany, to whom the idea of unlimited independence was peculiarly flattering, rose in many places, and committed a thousand acts of violence. But they were defeated by the troops of the empire, with great slaughter; and Muncer, who had deluded them, was taken, and beheaded in the year 1525.

But though the insurrection excited by that fanatic was so soon suppressed, several of his followers lurked in different places, and endeavoured privately to propagate his opinions.

In those provinces of Upper Germany which had already been so cruelly wasted by their enthusiastic rage, the magistrates watched their motions with such severe attention, that many of them found it necessary to retire into other countries; some were punished, others driven into exile, and their errors were entirely rooted out. But in the Netherlands and Westphalia, where the pernicious tendency of their opinions was more unknown, and guarded against with less care, they got admittance into several towns, and spread the infection of their principles.

In particular, two Anabaptist prophets, John Matthias, a baker of Haerlem, and John Boccold, or Beukels, a journeyman taylor of Leyden, possessed with the rage of making profelytes, fixed their residence at Munster, an imperial city in Westphalia, of the first rank, under the sovereignty of its bishop, but governed by its own senate and consuls. As neither of these fanatics wanted the talents necessary for such an undertaking, great resolution, the appearance of sanctity, bold pretensions to inspiration, and a confident and plausible manner of discoursing, they soon gained many converts. Among these were Rothman, who had first preached the Protestant doctrine in Munster, and Cnipperdoling, a citizen of good birth and considerable eminence. Emboldened by the countenance of such disciples, they openly taught their opinions; and not satisfied with that liberty, they made several attempts, tho' without success, to seize the town, in order to get their tenets established by public authority. At last, having secretly called in their associates from the neighbouring country, they suddenly took possession of the arsenal and senate-house in the night-time; and running through the streets with drawn swords, and horrible

Anabaptists.

howlings, cried out alternately, "Repent, and be baptized," and "Depart ye ungodly." The senators, the canons, the nobility, together with the more sober citizens, whether Papists or Protestants, terrified at their threats and outcries, fled in confusion; and left the city under the dominion of a frantic multitude, consisting chiefly of strangers. Nothing now remaining to overawe or controul them, they set about modelling the government according to their own wild ideas: and though at first they showed so much reverence for the ancient constitution, as to elect senators of their own sect, and to appoint Cnipperdoling and another profelyte consuls, this was nothing more than form; for all their proceedings were directed by Matthias, who in the style and with the authority of a prophet uttered his commands, which it was instant death to disobey. Having begun with encouraging the multitude to pillage the churches, and deface their ornaments; he enjoined them to destroy all books, except the bible, as useless or impious; he appointed the estates of such as fled to be confiscated, and sold to the inhabitants of the adjacent country; he ordered every man to bring forth his gold, silver, and precious effects, and to lay them at his feet: the wealth amassed by these means, he deposited in a public treasury, and named deacons to dispense it for the common use of all. The members of his commonwealth being thus brought to a perfect equality, he commanded all of them to eat at tables prepared in public, and even prescribed the dishes which were to be served up each day. Having finished his plan of reformation, his next care was to provide for the defence of the city; and he took measures for that purpose with a prudence which favoured nothing of fanaticism. He collected vast magazines of every kind; he repaired and extended the fortifications, obliging every person to work in his turn; he formed such as were capable of bearing arms into regular bodies, and endeavoured to add the vigour of discipline to the impetuosity of enthusiasm. He sent emissaries to the Anabaptists in the Low Countries, inviting them to assemble at Munster, which he dignified with the name of *Mount Zion*, that from thence they might set out to reduce all the nations of the earth under their dominion. He himself was unwearied in attending to every thing necessary for the security or increase of the sect; animating his disciples by his own example to refuse no labour, as well as to repine at no hardship; and their enthusiastic passions being kept from subsiding by a perpetual succession of exhortations, revelations, and prophecies, they seemed ready to undertake or to suffer any thing in maintenance of their opinions.

Meanwhile, the bishop of Munster having assembled a considerable army, advanced to besiege the town. On his approach, Matthias sallied out at the head of some chosen troops; attacked one quarter of his camp; forced it; and, after great slaughter, returned to the city, loaded with glory and spoil. Intoxicated with this success, he appeared next day brandishing a spear; and declared, that, in imitation of Gideon, he would go forth with a handful of men and smite the host of the ungodly. Thirty persons, whom he named, followed him without hesitation in this wild enterprize, and rushing on the enemy with a frantic courage were cut off to a man. The death of their prophet occasioned

at

at first great conformation among his disciples; but Boccold, by the same gifts and pretensions which had gained Matthias credit, soon revived their spirits and hopes to such a degree, that he succeeded him in the same absolute direction of all their affairs. As he did not possess that enterprising courage which distinguished his predecessor, he satisfied himself with carrying on a defensive war; and, without attempting to annoy the enemy by sallies, he waited for the succours he expected from the Low Countries, the arrival of which was often foretold and promised by their prophets. But though less daring in action than Matthias, he was a wilder enthusiast, and of more unbounded ambition. Soon after the death of his predecessor, having by obscure visions and prophecies prepared the multitude for some extraordinary event, he stripped himself naked, and, marching through the streets, proclaimed with a loud voice, "That the kingdom of Zion was at hand; that whatever was highest on earth should be brought low, and whatever was lowest should be exalted." In order to fulfil this, he commanded the churches, as the most lofty buildings in the city, to be levelled with the ground; he degraded the senators chosen by Matthias; and depriving Cnipperdoling of the consulship, the highest office in the commonwealth, he appointed him to execute the lowest and most infamous, that of common hangman; to which strange transition the other agreed, not only without murmuring, but with the utmost joy; and such was the despotism and rigour of Boccold's administration, that he was called almost every day to perform some duty or other of his wretched function. In place of the deposed senators, he named twelve judges, according to the number of tribes in Israel, to preside in all affairs; retaining to himself the same authority which Moses anciently possessed as legislator of that people.

Not satisfied, however, with power or titles which were not supreme, a prophet, whom he had gained and tutored, having called the multitude together, declared it to be the will of God, that John Boccold should be King of Sion, and sit on the throne of David. John kneeling down, accepted of the heavenly call, which he solemnly protested had been revealed likewise to himself; and was immediately acknowledged as a monarch by the deluded multitude. From that moment he assumed all the state and pomp of royalty. He wore a crown of gold, and the richest and most sumptuous garments. A bible was carried on his one hand, a naked sword on the other. A great body of guards accompanied him when he appeared in public. He coined money stamped with his own image, and appointed the great officers of his household and kingdom, among whom Cnipperdoling was nominated governor of the city, as a reward for his former submission.

Having now attained the height of power, Boccold began to discover passions, which he had hitherto restrained, or indulged only in secret. As the excesses of enthusiasm have been observed in every age to lead to sensual gratifications, the same constitution that is susceptible of the former being remarkably prone to the latter, he instructed the prophets and teachers to harangue the people for several days concerning the lawfulness and even necessity of taking more wives than one, which they asserted to be one of the privileges

granted by God to the saints. When their ears were once accustom'd to this licentious doctrine, and their passions inflamed with the prospect of such unbounded indulgence, he himself set them an example of using what he called their Christian liberty, by marrying at once three wives, among which the widow of Matthias, a woman of singular beauty, was one. As he was alured by beauty, or the love of variety, he gradually added to the number of his wives, until they amounted to fourteen, though the widow of Matthias was the only one dignified with the title of *queen*, or who shared with him the splendor and ornaments of royalty. After the example of their prophet, the multitude gave themselves up to the most licentious and uncontrolled gratification of their desires. No man remained satisfied with a single wife. Not to use their Christian liberty was deemed a crime. Persons were appointed to search the houses for young women grown up to maturity, whom they instantly compelled to marry. Together with polygamy, freedom of divorce, its inseparable attendant, was introduced, and became a new source of corruption. Every excess was committed of which the passions of men are capable, when restrained neither by the authority of laws nor the sense of decency; and by a monstrous and almost incredible conjunction, voluptuousness was engrafted on religion, and dissolute riot accompanied the austerities of fanatical devotion.

Meanwhile, the German princes were highly offended at the insult offered to their dignity by Boccold's presumptuous usurpation of royal honours; and the profligate manners of his followers, which were a reproach to the Christian name, filled men of all professions with horror. Luther, who had testified against this fanatical spirit on its first appearance, now deeply lamented its progress; and, exposing the delusion with great strength of argument, as well as acrimony of style, called loudly on all the states of Germany to put a stop to a phrenzy no less pernicious to society than fatal to religion. The emperor, occupied with other cares and projects, had no leisure to attend to such a distant object. But the princes of the empire, assembled by the king of the Romans, voted a supply of men and money to the bishop of Munster, who, being unable to keep a sufficient army on foot, had converted the siege of the town into a blockade. The forces raised in consequence of this resolution were put under the command of an officer of experience; who, approaching the town towards the end of spring in the year 1535, pressed it more closely than formerly; but found the fortifications so strong, and so diligently guarded, that he durst not attempt an assault. It was now above fifteen months since the Anabaptists had established their dominion in Munster; they had during that time undergone prodigious fatigue in working on the fortifications, and performing military duty. Notwithstanding the prudent attention of their king to provide for their subsistence, and his frugal and regular economy in their public meals, they began to feel the approach of famine. Several small bodies of their brethren, who were advancing to their assistance from the Low-Countries, had been intercepted, and cut to pieces; and while all Germany was ready to combine against them, they had no prospect of succour. But such was the ascendancy which Boccold had acquired over the multi-

tude, and so powerful the fascination of enthusiasm, that their hopes were as sanguine as ever; and they heartened with implicit credulity to the visions and predictions of their prophets, which assured them, that the Almighty would speedily interpose, in order to deliver the city. The faith, however, of some few, shaken by the violence and length of their sufferings, began to fail; but being suspected of an inclination to surrender to the enemy, they were punished with immediate death, as guilty of impiety in distrusting the power of God. One of the king's wives, having uttered certain words that implied some doubt concerning his divine mission, he instantly called the whole number together; and commanding the blasphemer, as he called her, to kneel down, cut off her head with his own hands; and so far were the rest from expressing any horror at this cruel deed, that they joined him in dancing with a frantic joy around the bleeding body of their companion.

By this time, the besieged endured the utmost rigour of famine; but they chose rather to suffer hardships, the recital of which is shocking to humanity, than to listen to the terms of capitulation offered them by the bishop. At last, a deserter, whom they had taken into their service, being either less intoxicated with the fumes of enthusiasm, or unable any longer to bear such distress, made his escape to the enemy. He informed their general of a weak part in the fortifications which he had observed; and assuring him that the besieged, exhausted with hunger and fatigue, kept watch there with little care, he offered to lead a party thither in the night. The proposal was accepted, and a chosen body of troops appointed for the service; who, scaling the walls unperceived, seized one of the gates, and admitted the rest of the army. The Anabaptists, tho' surprised, defended themselves in the market-place with valour, heightened by despair; but, being overpowered by numbers, and surrounded on every hand, most of them were slain, and the remainder taken prisoners. Among the last were the king and Caipperdoling. The king, loaded with chains, was carried from city to city as a spectacle to gratify the curiosity of the people, and was exposed to all their insults. His spirit, however, was not broken or humbled by this sad reverse of his condition; and he adhered with unshaken firmness to the distinguishing tenets of his sect. After this, he was brought back to Munster, the scene of his royalty and crimes, and put to death with the most exquisite and lingering tortures, all which he bore with astonishing fortitude. This extraordinary man, who had been able to acquire such amazing dominion over the minds of his followers, and to excite commotions so dangerous to society, was only 26 years of age.

Together with its monarch, the kingdom of the Anabaptists came to an end. Their principles having taken deep root in the Low-Countries, the party still subsists there, under the name of *Mennonites*; but by a very singular revolution, this sect, so mutinous and sanguinary at its first origin, hath become altogether innocent and pacific. Holding it unlawful to wage war, or to accept of civil offices, they devote themselves entirely to the duties of private citizens, and by their industry and charity endeavour to make reparation to human society for the violence committed by their founders. A small number of this sect, which is

settled in England, retain its peculiar tenets concerning baptism, but without any dangerous mixture of enthusiasm.

Within these 12 years, the Anabaptists have formed a congregation in Edinburgh, (which is the first appearance they ever made in Scotland.) They pray for the king and all inferior magistrates; and subject themselves (in civil matters) to every ordinance of man, for the Lord's sake. They consider the kingdom of Christ to be spiritual, and not of this world; and are strictly upon the congregational or independent plan, admitting of no jurisdiction or authority (in matters of religion) but that of the Great Lawgiver. Their church-officers are bishops (or elders) and deacons, and these they generally chuse from among themselves. They make the reading of the scriptures a part of their public service, and eat the Lord's supper every sabbath-day. Their disciples, before they are admitted into communion, are first baptized in the Water of Leith, which they do at all seasons of the year; and, on these occasions, they are generally attended by a great number of spectators.

ANABASCHI, in antiquity, were courriers who were sent on horseback, or in chariots, with dispatches of importance.

ANABLEPS, in ichthyology, the trivial name of a species of cobitis. See COBITIS.

ANABO, a small island situated near the coast of Loango in Africa, in E. Long. 9°. N. Lat. 1°. Here are several fertile valleys, which produce plenty of bananas, oranges, pine-apples, lemons, citrons, tamarinds, cocoa nuts, &c. together with vast quantities of cotton. In this island are two high mountains, which, being continually covered with clouds, occasion frequent rains.

ANABOLEUM, or ANABOLE, in antiquity, a kind of great or upper coat, worn over the tunica.

ANABOLEUS, in antiquity, an appellation given to grooms of the stable, or equerries, who assisted their masters in mounting their horses. As the ancients had no stirrups, or instruments that are now in use for mounting a horse, they either jumped upon his back, or were aided in mounting by anabolei.

ANACALYPTERIA, according to Suidas, were presents made to the bride by her husband's relations and friends when the first uncovered her face and shewed herself to men. These presents were also called *παλαια*; for, among the Greeks, virgins before marriage were under strict confinement, being rarely permitted to appear in public, or converse with the other sex; and when allowed that liberty, wore a veil over their faces, termed *κραυτήρα*, or *καλυτήρα*, which was not left off in the presence of men till the third day after marriage; whence, according to Hesychius, this day was also called *anacalypteron*.

ANACAMPSEROS, in botany, a synonyme of the portulaca, and several other plants.

ANACAMPTERIA, in ecclesiastical antiquity, a kind of little edifices adjacent to the churches, designed for the entertainment of strangers and poor persons.

ANACAMPTIC, a name applied by the ancients to that part of optics which treats of reflection, being the same with what is now called CATOPTICS.

ANACARDIUM, or CASHEW-NUT TREE, a genus of the monogynia order, belonging to the decandria class of plants.—Of this only one species is as yet known.

known to the botanists, viz. the occidentale. It grows naturally in the West-Indies, and arrives at the height of 20 feet in those places of which it is a native, but cannot be preserved in Britain without the greatest difficulty. The fruit of this tree is as large as an orange; and is full of an acid juice, which is frequently made use of in making punch. To the apex of this fruit grows a nut, of the size and shape of a hare's kidney, but much larger at the end which is next the fruit than at the other. The shell contains an inflammable oil, which is very caustic, so that it will raise blisters on the skin, and has often been very troublesome to those who put the nuts into their mouth to break the shell. The milky juice of this tree will stain linen of a deep black, which cannot be washed out; but it is not known whether the tree which produces the East India nuts called likewise *anacardium*, is of the same species with this or not. In 1770, Mr Banks and Dr Solander found several of these nuts lying on the ground in a deep valley in New Holland; upon which they made a most diligent search for the tree which bore them, (and which no European botanist ever saw), without being able to find it.

Culture. This plant is easily raised from the nuts, which should be planted each in a separate pot filled with light sandy earth, and plunged into a good hot-bed of tanners bark; they must also be kept from moisture till the plants come up, otherwise the nuts are apt to rot. If the nuts are fresh, the plants will come up in about a month; and in two months more, they will be four or five inches high, with large leaves: from which quick progress many people have been deceived, imagining they would continue the like quick growth afterwards; but with all the care that can be taken, they never exceed the height of two feet and an half, and for the most part scarce half as much.

Medicinal Uses. The medical virtues of anacardium have been greatly disputed: many have attributed to them the faculty of comforting the brain and nerves, fortifying the memory, and quickening the intellect; and hence a confection made from them has been dignified with the title of *confessio sapientum*: others think it better deserves the name of *confessio sultorum*, and mention instances of its continued use having rendered people maniacal. But the kernel of anacardium is not different in quality from that of almonds. The ill effects attributed to this fruit belong only to the juice contained betwixt the kernels; whose acrimony is so great, that it is said to be employed by the Indians as a caustic. This juice is recommended externally for tetters, freckles, and other cutaneous deformities; which it removes only by exulcerating or excoriating the part, so that a new skin comes underneath.

ANACATHARSIS, signifies a salivation, or discharge of noxious humours by spitting.

ANACATHARTICS, properly signify such medicines as promote the discharge of saliva.

ANACEPHALÆOSIS, in rhetoric, the same with recapitulation. See **RECAPITULATION**.

ANACHARSIS, a famous Scythian philosopher, conversed with Solon, and lived an austere life. Upon his return from his travels through Greece, he attempted to change the ancient customs of Scythia, and to establish those of Greece; which proved fatal to him. The king shot him dead in a wood with an arrow. A

great many statues were erected to him after his death. He is said to have invented tinder, the anchor, and the potter's wheel; but the latter is mentioned by Homer, who lived long before him. Anacharfis flourished in the time of Cæsar. Diogenes Laertius made an epigram upon his attempt to introduce the Grecian manners into his country, and his fate on that account.

ANACHORET, in church-history, denotes a hermit, or solitary monk, who retires from the society of mankind into some desert, with a view to avoid the temptations of the world, and to be more at leisure for meditation and prayer.

Such were Paul, Anthony, and Hilarion, the first founders of monastic life, in Egypt and Palestine.

Anachorets, among the Greeks, consist principally of monks, who retire to caves or cells, with the leave of the abbot, and an allowance from the monastery; or who, weary of the fatigues of the monastery, purchase a spot of ground, to which they retreat, never appearing again in the monastery, unless on solemn occasions.

ANACHRONISM, in matters of literature, an error with respect to chronology, whereby an event is placed earlier than it really happened.*

ANACLASTICS, that part of optics which considers the refraction of light, and is commonly called *Dioptrics*. See **DIOPTRICS**.

ANACLASTIC Glasses, a kind of sonorous phials, or glasses, chiefly made in Germany, which have the property of being flexible; and emitting a vehement noise by the human breath.—They are also called *vexing glasses* by the Germans (*vexier gläser*), on account of the fright and disturbance they occasion by their refraction.—The anaclastic glasses are a low kind of phials with flat bellies, resembling inverted funnels, whose bottoms are very thin, scarce surpassing the thickness of an onion peel: this bottom is not quite flat, but a little convex. But upon applying the mouth to the orifice, and gently inspiring, or as it were sucking out the air, the bottom gives way with a prodigious crack, and of convex becomes concave. On the contrary, upon expiring or breathing gently into the orifice of the same glass, the bottom with no less noise bounds back to its former place, and becomes gibbous as before.—The anaclastic glasses first taken notice of were in the castle of Goldbach; where one of the academists *Nature Curiosorum*, having seen and made experiments on them, published a piece expressive on their history and phenomena. They are all made of a fine white glass. It is to be observed in these, 1. That if the bottom be concave at the time of inspiration, it will burst; and the like will happen if it be convex at the time of expiration. 2. A strong breath will have the same effect even under the contrary circumstances.

ANACLETERIA, in antiquity, a solemn festival celebrated by the ancients when their kings or princes came of age, and assumed the reins of government. It is so called, because proclamation being made of this event to the people, they went to salute their prince during the anacleteria, and to congratulate him upon his new dignity.

ANACLINOPALE, *ANACHLINOPE*, in antiquity, a kind of wrestling, wherein the champions threw themselves voluntarily on the ground, and continued the combat by pinching, biting, scratching, and other me-

Anacrin-
teria
||
Anacrisis.

thods of offence. The *Anacrinpale* was contradistinguished from the *Orthopale*, wherein the champions stood erect. In the *Anacrinpale*, the weaker combatants sometimes gained the victory.

ANACLINTERIA, in antiquity, a kind of pillows on the dining-bed, whereon the guests used to lean. The ancient triclinary beds had four *anacrinæ*, one at the head, another at the feet, a third at the back, and a fourth at the breast. That on which the head lay, was properly called by the Greeks *anacrinopora*, or *anacrinopora*; by the Romans *fulcrum*, sometimes *plateus*.

ANACOLLEMA, a composition of affringent powders, applied by the ancients to the head, to prevent defluxions on the eyes.

ANACREON, a Greek poet, born at Teos, a city of Ionia, flourished about 532 years before the Christian era. Polycrates, tyrant of Samos, invited him to his court, and made him share with him in his business and his pleasures. He had a delicate wit, as may be judged from the inexpressible beauties and graces that shine in his works: but he was fond of pleasure, was of an amorous disposition, and addicted to drunkenness: yet, notwithstanding his debaucheries, he lived to the age of 85; when, we are told, he was choked by a grape-stone which stuck in his throat as he was regaling on some new wine.

There is but a small part of Anacreon's works that remain; for, besides his odes and epigrams, he composed elegies, hymns, and iambics. His poems which are extant were rescued from oblivion by Henry Stephens, and are universally admired. The verses of Anacreon are sweeter, says Scaliger, than Indian sugar. His beauty and chief excellence, says Madam Dacier, lay in imitating nature, and in following reason, so that he presented to the mind no images but what were noble and natural. The odes of Anacreon, says Rabin, are flowers, beauties, and perpetual graces; it is familiar to him to write what is natural and to the life, he having an air so delicate, so easy, and graceful, that among all the ancients there is nothing comparable to the method he took, nor to that kind of writing he followed. He flows soft and easy, every where diffusing the joy and indolence of his mind thro' his verse, and tuning his harp to the smooth and pleasant temper of his soul. But none has given a juster character of his writings than the God of Love, as taught to speak by Mr Cowley:

All thy verse is softer far
Than the downy feathers are,
Of my wings, or of my arrows,
Of my mother's doves and sparrows:
Graceful, cleanly, smooth, or round,
All with Venus' girle bound.

ANACREONTIC VERSE, in ancient poetry, a kind of verse, so called from its being much used by the poet Anacreon. It consists of three feet and an half, usually spondee and iambuses, and sometimes anapests: Such is that of Horace,

Lydia, dic per omnes.

ANACRISIS, among the ancient Greeks, is used for a kind of trial, or examination, which the archons, or chief magistrates of Athens, were to undergo before their admission into that office. The *anacrisis* stands distinguished from the *docimasia*, which was a second examination, in the forum. The *Anacrisis* was performed in the senate-house. The question here propo-

fed to them were concerning their family, kindred, behaviour, estate, &c. Some will have it that all magistrates underwent the *anacrisis*.

ANACRISIS, among civilians, an investigation of truth, interrogation of witnesses, and inquiry made into any fact, especially by torture.

ANACYCLUS, in botany, a genus of the polygamia superflua order, belonging to the *syngenesia* class of plants. It has neither beauty nor use, and therefore merits no description.

ANADAVADÆA, in ornithology, a barbarous name of a species of alauda. See *ALAUDA*.

ANADEMA, among the ancients, denotes an ornament of the head, wherewith victors at the sacred games had their temples bound.

ANADIPLOSIS, in rhetoric and poetry, a repetition of the last word of a line, or clause of a sentence, in the beginning of the next: Thus,

*Pirides, vos hac facietis maxima Gallo;
Gallo, ejus amor, &c.
Et moluitis accedula vocibus inflat,
Vocibus inflat, & assiduus jacit ore querelas.*

ANADOSIS, among physicians, the distribution of the aliment over the body.

ANADROMOUS, among ichthyologists, a name given to such fishes as go from the sea to the fresh waters at stated seasons, and return back again; such as the salmon, &c. See *SALMO*.

ANÆDEIA, in antiquity, a denomination given to a silver stool placed in the Areopagus, on which the defendant, or person accused, was seated for examination. The word is Greek, *Anædeia*, which imports impudence; but, according to Junius's correction, it should rather be *Anædia*, q. d. *innocence*. The plaintiff, or accuser, was placed on an opposite stool called *tybris*, or injury; here he proposed three questions to the party accused, to which positive answers were to be given. The first, Are you guilty of this fact? The second, How did you commit the fact? The third, Who were your accomplices?

ANÆSTHESIA, signifies a privation of the senses.

ANAGALLIS, *PIMPERNEL*; a genus of the monogynia order, belonging to the pentandria class of plants. Of this there are four

Species. 1. The arvensis, or common pimpernel, with a red flower. 2. The femina, with a blue flower. 3. The monelli, or narrow-leaved pimpernel. 4. The latifolia, or Spanish pimpernel.—The first sort is very common in corn-fields, and other cultivated places in Britain. The second is sometimes found wild in the fields, but is not so common as the first. The third is a beautiful small perennial plant, and produces numbers of fine blue flowers. The fourth is a native of Spain, and likewise produces blue flowers. All the species are eat by cows and goats, but refused by sheep; small birds are greatly delighted with the seeds.

These plants are very easily propagated by seeds; and if suffered to remain till their seeds scatter, they become troublesome weeds.—Great medicinal virtues were formerly expected from the first two species; but they are now justly disregarded, though they still retain a place in the materia medica.

ANAGNIA, a town of Latium, capital of the Hernici, (Livy, Pliny, Virgil); which, after a faint resistance, submitting to the Romans, was admitted to the freedom.

Anacrisis
||
Anagnia.

Anagnosia
Anagram

freedom of the city, yet without the right of suffrage, (Livy.) It was afterwards a colony of Drusus Cæsar, and walled round, and its territory assigned to the veterans, (Frontinus.) Here Antony married Cleopatra, and divorced Octavia. Now *Anagni*, 36 miles to the east of Rome. Long. 13. 45. Lat. 42. 48.

ANAGNOSTA, or **ANAGNOSTES**, in antiquity, a kind of literary servant, retained in the families of persons of distinction, whose chief business was to read to them during meals, or at any other time when they were at leisure. Cornelius Nepos relates of Atticus, that he had always an agnostes at his meals. He never supped without reading; so that the minds of his guests were no less agreeably entertained than their appetites. The same custom, Eginhard observes, was kept up by Charlemagne, who at table had the histories and acts of ancient kings read to him. This custom seems to have been a relic of that of the ancient Greeks, who had the praises of great men and heroes sung to them while at table. The ancient monks and clergy kept up the like usage, as we are informed by St Augustine.

ANAGOGICAL, signifies mysterious, transporting; and is used to express whatever elevates the mind, not only to the knowledge of divine things, but of divine things in the next life. This word is seldom used, but with regard to the different senses of Scripture. The analogical sense is, when the sacred text is explained with a regard to eternal life, the point which Christians should have in view: for example, the rest of the sabbath, in the anagogical sense, signifies the repose of everlasting happiness.

ANAGOGY, or **ANAGOGE**, among ecclesiastical writers, the elevation of the mind to things celestial and eternal.—It is particularly used, where words, in their natural or primary meaning, denote something sensible, but have a further view to something spiritual or invisible.

ANAGOGY, in a more particular sense, denotes the application of the types and allegories of the Old Testament to subjects of the New; thus called, because the veil being here drawn, what before was hidden, is exposed to open sight.

ANAGRAM, (from the Greek *ana backwards*, and *γινωσκω letter*), in matters of literature, a transposition of the letters of some name, whereby a new word is formed, either to the advantage or disadvantage of the person or thing to which the name belongs. Thus, the anagram of Galenus is *angelus*; that of Logica, *caligo*; that of Alstedius, *ſadulitas*; that of Lorraine is *alerion*, for which account it was that the family of Lorraine took *alerions* for their armoury.—Calvin, in the title of his *Institutiones*, printed at Straßburg in 1539, calls himself *Aleuinus*, which is the anagram of Calvinus, and the name of an eminently learned person in the time of Charlemagne, who contributed greatly to the restoration of learning in that age.

Those who adhere strictly to the definition of an anagram, take no other liberty than that of omitting or retaining the letter *h*, at pleasure; whereas others make no scruple to use *e* for *æ*, *v* for *w*, *s* for *z*, and *c* for *k*; and *vice versa*.

Besides anagrams formed as above, we meet with another kind in ancient writers, made by dividing a single word into several; thus, *ſus tinea mus*, are formed out

of the word *ſuſtineamus*.

Anagrams are sometimes also made out of several words: such is that on the question put by Pilate to our Saviour, *Quid eſt veritas?* whereof we have this admirable anagram, viz. *eſt vir qui addeſt*.

The Cabbalists among the Jews are professed anagrammatists; the third part of their art, which they call *themuru*, i. e. changing, being nothing but the art of making anagrams, or of finding hidden and mystical meanings in names; which they do by changing, transposing, and differently combining, the letters of those names.—Thus, of the letters of Noah's name, they make *in grace*; of *משיח* the Messiah, they make *משה* he shall rejoice.

ANAGRAMMATIST, a maker or composer of anagrams. Thomas Billon, a provincial, was a celebrated anagrammatist, and retained by Lewis XIII. with a pension of 1200 livres, in quality of anagrammatist to the king.

ANAGROS, in commerce, a measure for grain used in some cities of Spain, particularly at Seville; 46 anagros make about 10½ quarters of London.

ANAGYRIS, STINKING BEAN-TREFOIL; a genus of the monogynia order, belonging to the decandria class of plants.

Of this genus there is but one species, which grows naturally in the southern parts of Europe. It is a shrub which usually rises to the height of eight or ten feet, and produces its flowers in April or May. These are of a bright yellow colour, growing in spikes, somewhat like the laburum.

Culture. This plant may be propagated either by seeds, or by laying down the tender branches in the spring; but the first method is preferable. The seeds should be sown toward the end of March in pots filled with light earth, and plunged in a gentle hot-bed. The plants usually appear in a month, when they should be gradually inured to the open air, that they may be hardened before winter. In the autumn and winter, they must be sheltered under a hot-bed frame: the spring following, they must be transplanted, each into a separate small pot, placed in a sheltered situation, and again removed into a frame to shelter them during the following winter. The second spring after the plants come up, some of them may be taken out of the pots, and planted in a border near a south-wall, where, if they are protected in winter, they may remain.

ANAGYRIS, or **ANAGYRUS**, the name of a place in Attica, of the tribe Erechtheis, where a fetid plant, called *Anagyris*, probably the same with the foregoing, grew in great plenty, (Dioscorides, Pliny, Stephanus;) and the more it was handled, the stronger it smelled: hence *commovere anagyris* (or *anagrum*), is to bring a misfortune on one's self, (Aristophanes.)

ANALECTA, or **ANALECTES**, in antiquity, a servant whose employment it was to gather up the off-falls of tables.

ANALECTA, *Analectis*, in a literary sense, is used to denote a collection of small pieces: as essays, remarks, &c.

ANALEMMA, in geometry, a projection of the sphere on the plane of the meridian, orthographically made by straight lines and ellipses, the eye being supposed at an infinite distance, and in the east or west points of the horizon.

Anagram:
matist
Analemma.

Analemma

Analysis.

ANALEMMA, denotes likewise an instrument of brass or wood, upon which this kind of projection is drawn, with an horizon and cursor fitted to it, wherein the solstitial colure, and all circles parallel to it, will be concentric circles; all circles oblique to the eye, will be ellipses; and all circles whose planes pass through the eye, will be right lines. The use of this instrument is to shew the common astronomical problems; which it will do, though not very exactly, unless it be very large.

ANALEPSIS, the augmentation or nutrition of an emaciated body.

ANALECTICS, restorative or nourishing medicines.

ANALOGY, in matters of literature, a certain relation and agreement between two or more things, which in other respects are entirely different.

There is likewise an analogy between beings that have some conformity or resemblance to one another; for example, between animals and plants; but the analogy is still stronger between two different species of certain animals.

Analogy enters much into all our reasoning, and serves to explain and illustrate. A great part of our philosophy has no other foundation than analogy, the utility of which consists in superseding all necessity of examining minutely every particular body; for it suffices us to know that every thing is governed by general and immutable laws, in order to regulate our conduct with regard to all similar bodies, as we may reasonably believe that they are all endowed with the same properties: Thus, we never doubt that the fruit of the same tree has the same taste.

ANALOGY, among grammarians, is the correspondence which a word or phrase bears to the genius and received forms of any language.

ANALYSIS, in a general sense, implies the resolution of something compounded into its original and constituent parts. The word is Greek, and derived from *analusis*, to resolve.

ANALYSIS, in mathematics, is properly the method of resolving problems by means of algebraical equations; whence we often find that these two words, *analysis* and *algebra*, are used as synonymous.

Analysis, under its present improvements, must be allowed the apex or height of all human learning: it is this method which furnishes us with the most perfect examples of the art of reasoning; gives the mind an uncommon readiness at deducing and discovering, from a few data, things unknown; and, by using signs for ideas, presents things to the imagination, which otherwise seemed out of its sphere: by this, geometrical demonstrations may be greatly abridged, and a long series of argumentations, wherein the mind cannot without the utmost effort and attention discover the connection of ideas, are hereby converted into sensible signs, and the several operations required therein effected by the combination of those signs. But, what is more extraordinary, by means of this art, a number of truths are frequently expressed by a single line, which in the common way of explaining and demonstrating things would fill whole volumes. Thus, by mere contemplation of one single line, whole sciences may be sometimes learnt in a few minutes time, which otherwise could scarce be attained in many years.

ANALYSIS is divided, with regard to its object, into

that of *finites*, and *infinites*.

ANALYSIS of *Finite Quantities*, is what we otherwise call specious arithmetic or algebra. See ALGEBRA.

ANALYSIS of *Infinities*, called also the *New Analysis*, is particularly used for the method of fluxions, or the differential calculus. See FLUXIONS.

ANALYSIS, in logic, signifies the method of tracing things backwards to their source, and of resolving knowledge into its original principles. This is also called the method of *resolution*; and stands opposed to the synthetic method, or that of *composition*.—The art of logical analysis consists principally in combining our perceptions, classing them together with address, and contriving proper expressions for conveying our thoughts, and representing their several divisions, classes, and relations.

ANALYSIS, in chemistry, the reducing of an heterogeneous or mixed body, into its original principles or component parts. See CHEMISTRY.

ANALYSIS is also used for a brief but methodical illustration of the principles of a science; in which sense, it is nearly synonymous with what we otherwise call a *synopsis*.

ANALYTIC, or ANALYTICAL, something that belongs to, or partakes of, the nature of analysis.—Thus we say, an analytical demonstration, analytical process, analytical table or scheme, analytical method of investigation, &c.

The analytic method stands opposed to the synthetic. In natural philosophy, as in mathematics, the investigation of difficult things by the analytic method ought to precede the method of composition. This analysis consists in making experiments and observations, and in drawing general conclusions therefrom by induction; and admitting of no objections against the conclusions, but such as are drawn from experiments, and other certain truths: and though the reasoning from experiments and observations by induction be no demonstration of general conclusions, yet it is the best method of reasoning which the nature of things admits of; and may be esteemed so much the stronger, as the induction is more general; and, if no exception occur from phenomena, the conclusion may be pronounced general. By this way of analysis, we may proceed from compounds to their ingredients; from motions to the forces producing them; and in general from effects to their causes, and from particular causes to more general ones, until we arrive at those which are the most general. This is the analytic method, according to the illustrious Newton.

The synthetic method consists in assuming the causes discovered and received as principles; and by them explaining the phenomena proceeding from them, and proving the explanations. See SYNTHESIS.

ANALYTICS, *Analytica*, the science and use of analysis. The great advantage of the modern mathematics above the ancient is in point of analytics.

Pappus, in the preface to his seventh book of Mathematical Collections, enumerates the authors on the ancient analytics; being Euclid, in his *Data* and *Porismata*; Apollonius, de *Sectione Rationis*, and in his *Conics*; Aristotle, de *Locis Solidis*; and Eratosthenes, de *Mediis Proportionalibus*. But the ancient analytics were very different from the modern.

To the modern analytics principally belong algebra; an

Analysis

Analytics.

Anamaboa
 Ananias.

an historical account of which, with the several authors thereon, see under the article ALGEBRA.

ANAMABOA, a populous town in the kingdom of Fantin, in Guinea. The natives are generally great cheats, and must be carefully looked after in dealing with them, and their gold well examined, for it is commonly adulterated. It lies under the cannon of the English castle. The landing is pretty difficult, on account of the rocks; and therefore those that come here to trade are forced to go ashore in canoes. The earth here is very proper to make bricks; the oysters, when burnt, afford good lime; and there is timber in great abundance; so that here are all the materials for building. The country at Anamaboa is full of hills, beginning at a good distance from the town, and affording a very pleasant prospect. Indian corn and palm-wine are in great plenty. They have a green fruit called *papas*, as big as a small melon, and which has a taste like cauliflower. Anamaboa is much frequented by the English ships and others for corn and slaves, which last are sometimes to be had in great numbers. The English fort is built on the foundation of a large old house, which subsisted entire in 1679. It is a large edifice, flanked by two towers, and fortified towards the sea with two battions: the whole of brick and stone cemented with lime. It stands upon a rock at the distance of 30 paces from the sea. It is mounted with 12 pieces of canon and 12 patercores; and defended by a garrison of 12 whites and 18 blacks, under the command of the chief factor.

The natives treat the garrison of this fort with great insolence, inasmuch as often to block them up, and frequently, if they dislike the governor, fend him off in a canoe to Cape Coast with marks of the utmost contempt. Far from being able to oppose them, the English are glad to obtain their favour with presents. In 1701, they declared war against the English; and having assembled in a tumultuous manner before the fort, they set fire to the exterior buildings, and went on with their outrages, till they were dispersed by a discharge of the cannon from the batteries. The night following the English took their revenge, by setting fire to the town of Anamaboa; and thus hostilities continued for 20 days, till at last the natives were obliged to sue for peace. This fort was abandoned in 1733; but has been resumed by the English, who have continued in it ever since.

ANAMELECH, an idol of the Sepharvites, who are said in Scripture to have burned their children in honour of Adramelech and Anamelech.—These idols probably signified the sun and moon. Some of the rabbins represent Anamelech under the figure of a mule; others under that of a quail or pheasant.

ANAMORPHOSIS, in perspective and painting, a monstrous projection, or representation of an image, on a plane or curve surface, which, beheld at a proper distance, shall appear regular and in proportion.

ANANAS, in botany, the trivial name of a species of bromelia. See *BROMELIA*.

ANANCITIS, in antiquity, a kind of figured stone, otherwise called *synchitis*, celebrated for its magical virtue of raising the shadows of the infernal gods.

ANANIAS, a Sadducee, high-priest of the Jews, who put to death St James the brother of our Lord, and was deposed by Agrippa.

ANANISABTA, or **ANANISAPTA**, a magical word frequently found inscribed on coins and other amulets, supposed to have a virtue of preserving the wearer from the plague.

ANAPÆST, in ancient poetry, a foot consisting of two short syllables, and one long: Such is the word *scôpûlos*. It is just the reverse of the dactyl.

ANAPÆSTIC *VERSES*, those consisting wholly or chiefly of anapæsts.

ANAPHE, (anc. geogr.) an island spontaneously emerging out of the Cretan sea, near Thera, (Pliny, Strabo.) Now called *Naxos*. Its name is from the sudden appearance of the new moon to the Argonauts in a storm, (Apollonius.) *Anaphæus*, an epithet of Apollo, who was worshipped there. *Anaphæi*, the people.

ANAPHORA, in rhetoric, the repetition of the same word or words in the beginning of a sentence or verse: Thus Virgil,

*Pan etiam Arcadia mecum se judice ceteris,
 Pan etiam Arcadia deat se judice vitulum.*

ANAPHORA, among physicians, the throwing off purulent matter by the mouth.

ANAPHRODISIA, signifies impotence, or want of power to procreate.

ANAPIS, a river of Sicily. See *SICILY*.

ANAPLASIS, signifies the replacing or setting a fractured bone.

ANAPLEROTICS, medicines that promote the growth or granulation of the flesh, in wounds, ulcers, &c.

ANARCHI, *αναρχοι*, in antiquity, a name given by the Athenians to four supernumerary days in their year, during which they had no magistrates. The Attic year was divided into ten parts, according to the number of tribes, to whom the precedence of the senate fell by turns. Each division consisted of 35 days; what remained after the expiration of these, to make the lunar year complete, which according to their computation consisted of 354 days, were employed in the creation of magistrates, and called *αναρχοι ημεραι*, and *αρχαιημεραι*.

ANARCHY, the want of government in a nation, where no supreme authority is lodged, either in the prince or other rulers; but the people live at large, and all things are in confusion. The word is derived from the Greek privative *α*, and *αρχη*, command, *principality*. Anarchy is supposed to have reigned after the deluge, before the foundation of monarchies. We still find it obtain in several parts, particularly of Africa and America.

ANARCHY is also applied to certain troublesome and disorderly periods, even in governments otherwise regular. In England, the period between the death of Cromwell and King Charles's restoration is commonly represented as an *anarchy*. Every month produced a new scheme or form of government. Enthusiasts talked of nothing but annulling all the laws, abolishing all writings, records, and registers, and bringing all men to the primitive level. No modern nation is more subject to *anarchy* than Poland; where every interval between the death of one king and the election of another is a perfect picture of confusion, inasmuch that it is a proverb among that people, *Poland is governed by confusion*. The Jewish history presents numerous instances of *anarchy*.

Anarrhæus. *anarrhæus* in that state, usually denoted by this phrase, that in those days there was no king in Israel, but every man did that which was right in his own eyes; which is a just picture of an anarchy.

ANARRHICÆ, in ichthyology, a genus of fishes of the order of apodes. There is but one species of this genus, viz. the anarrhæus lupus, or sea-wolf; which seems to be confined to the northern parts of the globe. We find it in the seas of Greenland; in those of Iceland and Norway; on the coasts of Scotland, and of Yorkshire; and lastly, in that part of the German ocean which washes the shores of Holland, the most southern of its haunts that we can with any certainty mention.

It is a most ravenous and fierce fish, and, when taken, fastens on any thing within its reach: the fishermen dreading its bite, endeavour as soon as possible to beat out its fore-teeth, and then kill it by striking it behind the head. Schoneveldt relates, that its bite is so hard, that it will seize on an anchor, and leave the marks of its teeth in it; and the Danish and German names of *steenbider* and *steinbeisser*, express the sense of its great strength, as if it was capable of crushing even stones with its jaws.

It feeds almost entirely on crustaceous animals and shell-fish, such as crabs, lobsters, prawns, muscles, scollops, large whelks, &c. these it grinds to pieces with its teeth, and swallows with the lesser shells. It does not appear they are dissolved in the stomach, but are voided with the feces, for which purpose the aperture of the anus is wider than in other fish of the same size.

It is full of roe in February, March, and April, and spawns in May and June.

This fish has so disagreeable and horrid an appearance, that nobody at Scarborough except the fishermen will eat it, and they prefer it to holibut. They always before dressing take off the head and skin.

The sea-wolf grows to a large size: those on the Yorkshire coast are sometimes found of the length of four feet; according to Dr Gronovius, they have been taken near Shetland seven feet long, and even more.

The head is a little flattened on the top; the nose blunt; the nostrils are very small; the eyes small, and placed near the end of the nose.

The teeth are very remarkable, and finely adapted to its way of life. The fore-teeth are strong, conical, diverging a little from each other, stand far out of the jaws, and are commonly six above and the same below, tho' sometimes there are only five in each jaw: these are supported within-side by a row of lesser teeth, which makes the number in the upper jaw 17 or 18, in the lower 11 or 12. The sides of the under jaw are convex inwards, which greatly adds to their strength, and at the same time allows room for the large muscles with which the head of this fish is furnished. The *dentes molares*, or grinding teeth of the under jaw, are higher on the outer than the inner edges, which inclines their surfaces inward: they join to the canine teeth in that jaw, but in the upper are separate from them. In the centre are two rows of flat strong teeth, fixed on an oblong basis upon the bones of the palate and nose.

The teeth of the anarrhæus are often found fossil; and in that state called *byssinites*, or *toad-stones*: these were formerly much esteemed for their imaginary virtues, and were set in gold, and worn as rings.

The two bones that form the under jaw are united before by a loose cartilage; which mechanism admitting of a motion from side to side, most evidently contributes to the design of the whole, viz. a facility of breaking, grinding, and comminuting, its testaceous and crustaceous food. At the entrance of the gullet, above and below, are two ciliated bones: these are very small, being the less necessary, as the food is in a great measure comminuted in the mouth by aid of the grinders.

The body is long, and a little compressed sidewise; the skin smooth and slippery: it wants the lateral line. The pectoral fins consist of 18 rays. The dorsal fin extends from the hind-part of the head almost to the tail; the rays in the fresh fish are not visible. The anal fin extends as far as the dorsal fin. The tail is round at its end, and consists of 13 rays. The sides, back, and fins, are of a livid lead colour; the two first marked downwards with irregular obscure dusky lines: these in different fish have different appearances. The young are of a greenish cast, resembling the sea-wrack, amongst which they reside for some time after their birth.

ANARROPIA, among physicians, a tendency of the humours to the head or superior parts.

ANAS, in ornithology, a genus of birds belonging to the order of anseres. The beak of this genus is a little obtuse, covered with an epidermis or skin, gibbous at the base, and broad at the apex; the tongue is obtuse and fleshy; the feet are webbed and fitted for swimming. The species are,

1. The cygnus, *ferus* & *mansuetus*.

α. The ferus, with a semicylindrical black bill, yellow wax, and a white body, is the wild swan of English authors, and a native of Europe and North America. Linnæus says, they frequently visit Sweden after a thaw, and are caught with apples in which a hook is concealed. The wild swan frequents our coasts in hard winters in large flocks, but as far as we can inform ourselves does not breed in Great Britain. Martin * acquaints us, that swans come in October in great numbers to Linney, one of the Western Isles; and continue there till March, when they retire northward to breed. A few continue in Mainland, one of the Orkneys, and breed in the little isles of the fresh-water lochs; but the multitude retires at the approach of spring. On that account, swans are there the country-man's almanack: on their quitting the isle, they presage good weather; on their arrival, they announce bad. These, as well as most other water-fowl, prefer, for the purpose of incubation, those places that are least frequented by mankind: accordingly we find that the lakes and forests of the distant Lapland are filled during summer with myriads of water-fowl; and there swans, geese, the duck-tribe, geeseanders, divers, &c. pass that season; but in autumn return to us, and to other more hospitable shores. This species is less than the tame swan: length, five feet to the end of the feet; to that of the tail, four feet ten inches: extent of wing, seven feet three inches: weight, from thirteen to sixteen pounds. The cry of this kind is very loud, and may be heard at a great distance, from which it is sometimes called the *Hooper*.

β. The mansuetus, or tame swan. This is the largest of the British birds. It is distinguished externally from the wild swan; first, by its size, being much larger; secondly, by its bill, which in this is red, and the tip

* Descrip.
West. Isles,
71.

Anas;
or
swan, goose,
and duck.

and sides black, and the skin between the eyes and bill is of the same colour. Over the base of the upper mandible, projects a black callous knob: the whole plumage, in old birds, is white; in young ones, ash-coloured till the second year: the legs are dusky; but Dr Plott mentions a variety found on the Trent near Rugely, with red legs. The swan lays seven or eight eggs, and is near two months in hatching: it feeds on water-plants, insects, and shells. No bird, perhaps, makes so inelegant a figure out of the water, or has the command of such beautiful attitudes in that element, as the swan: almost every poet has taken notice of it; but none with that justness of description, and in so picturesque a manner, as our Milton:

The swan, with arched neck
Between her white wings mantling, proudly rows
Her flate with cary feet. *Par. Lost. B. vii.*

In former times, it was served up at every great feast, when the elegance of the table was measured by the size and quantity of the good cheer. Cygnets are to this day fattened at Norwich, about Christmas; and are sold for a guinea a-piece.

Swans were formerly held in such great esteem in England, that by an act of Edward IV. c. 6. "no one that possessed a freshold of less clear yearly value than five marks, was permitted to keep any, *other than the son of our sovereign lord the king.*" And by the eleventh of Henry VII. c. 17. the punishment for taking their eggs was imprisonment for a year and a day, and a fine at the king's will. Though at present they are not so highly valued as a delicacy, yet great numbers are preserved for their beauty; we see multitudes on the Thames and Trent, but no where greater numbers than on the salt-water inlet of the sea near Abbotbury in Dorsetshire.

These birds were by the ancients consecrated to Apollo and the Muses;

— ἵψα κυνὸς μιλάει
Μοῦσαις δεικνύει. *Eurip. Iphig. in Taur. 1104.*

And Callimachus, in his hymn upon the island of Delos, is still more particular:

— When from Pælusius' golden banks
Apollo's tuneful songsters, snowy swans,
Steering their flight, seven times their circling course
Wheel round the island, caroling mean time
Soft melody, the favourites of the Nine,
Thus ushering to birth with dulcet sounds
The God of harmony: and hence cease'n strings
Hereafter to his golden lyre he gave;
For ere the eighth soft concert was begun,
He sprung to birth. *Dodd's Callimachus, p. 115.*

Upon this idea of their being peculiarly consecrated to Apollo and the Muses (the deities of harmony,) seems to have been ingrafted the notion the ancients had of swans being endowed with a musical voice. Though this might be one reason for the fable; yet there appears another stronger, which arose from the Pythagorean doctrine of the transmigration of the soul into the bodies of animals; from the belief, that the body of the swan was allotted for the mansion of departed poets. Thus Plato makes his prophet say, ἰδὲ μὲν γὰρ Διὶ καὶ τῇ ποτὶ Ὀρφέα γενέμεναι κυνὶ βίον αἰρεμένῃ; "I saw the soul of Orpheus prefer the life of a swan."

After the ancients had thus furnished these birds with such agreeable inmates, it is not to be doubted but they would attribute to them the same powers of har-

mony that poets possessed previous to their transmigration: but the vulgar, not distinguishing between the sweetness of numbers and that of voice, ignorantly believed that to be real, which philosophers and poets only meant metaphorically.

In time, a swan became a common trope for a bard. Horace calls Pindar, *Dirceum Cygnum*; and in one ode, even supposes himself changed into a swan. Virgil speaks of his poetical brethren in the same manner,

Vare, tuum nomen
Cantantes sublimē ferent ad fydere cygni. *Ecl. ix.*

When he speaks of them figuratively, he ascribes to them melody, or the power of music; but when he talks of them as birds, he lays aside fiction, and, like a true naturalist, gives them their real note:

Dant sonitum ranci per stagna loquacia cygni.
Æneid. Lib. X. 50.

Thus he, as well as Pliny, gave no credit to the music of swans. Aristotle speaks of it only by hearsay. But, when once an error is started, it is not surprising that it is adopted; especially by poets, geniuses of all others of the most unbounded imaginations. For this reason, poets were said to animate swans, from the notion that they flew higher than any other birds; and Hesiod distinguishes them by the epithet of *κυκνὶ αἰριστοῖσι*, "the lofty flying swans."

Besides these opinions, the ancients held another still more singular, imagining that the swan foretold its own end. To explain this, we must consider the twofold character of the poet, *vates* and *poeta*, which the fable of the transmigration continues to the bird; or they might be supposed to derive that faculty from Apollo their patron deity, the god of prophecy and divination.

As to their being supposed to sing more sweetly at the approach of death, the cause is beautifully explained by Plato, who attributes that unusual melody to the same sort of ecstacy that good men are sometimes said to enjoy at that awful hour, foreseeing the joys that are preparing for them on putting off mortality: Μάλλον τι νῦν, καὶ προύδοτες τὰν Ἀδῶν ἄγαθα, αἰσῶν τι, καὶ τεύχονται ἱκάνειν τὴν καίμην διαφέροντος ἢ, ἐν τῷ προὔδῃ χρόνῳ: "They become prophetic; and, foreseeing the happiness which they shall enjoy in another state, are in greater ecstacy than they have before experienced."

2. The cygnoides, with a semicylindrical bill, gibbous wax, and tumid eye-brows: It is the swan-goose of Ray, from Guinea. There is likewise a variety of this species, of a less size, called the *goose of Muscovy*.

3. The adorna, or heildrake, has a flat bill, a compressed forehead, a greenish black head, and the body is variegated with white. This species frequents the sea-coasts of Europe, and breed in rabbit holes. When a person attempts to take their young, the old birds shew great address in diverting his attention from the brood; they will fly along the ground as if wounded, till the former are got into a place of security, and then return and collect them together. From this instinctive cunning, Turner, with good reason, imagines them to be the *chenalopez*, or *fox-goose*, of the ancients: the natives of the Orkneys to this day call them the *fly-goose*, from an attribute of that quadruped. They lay 15 or 16 eggs, white, and of a roundish shape. In winter they collect in great flocks. Their flesh is very rank and bad.

4. The spectabilis, has a compressed bill, gibbous at the

Anas;
or
swan, goose,
and duck.

Anas;
or
swan, goose,
and duck.

the base, a black feathery carina, and a hoary head. It is the grey-headed duck of Edwards; and is a native of Sweden and Canada.

5. The fulca, or velvet duck, is of a blackish colour, has a white spot behind the eyes, and a white line on the wings. The male of this species is distinguished by a gibbosity at the base of the bill. It is the black duck of Ray, and a native of the European seas.

6. The nigra, or scoter, is totally black, and has a gibbosity at the base of the bill; the tail resembles a wedge; the female is brownish. It is the lesser black diver of Ray, and a native of Britain and Lapland. This bird is allowed in the Romish church to be eaten in Lent; and is the macreufe of the French. It is a great diver, said to live almost constantly at sea, and to be taken in nets placed under water.

7. The anser, *ferus* & *mansuetus*; or grey lag, and bean-geese. The grey lag is two feet nine inches in length, and five feet in extent. The bill is large and elevated; of a flesh colour, tinged with yellow; the head and neck cinereous; breast and belly whitish, clouded with grey or ash colour; back, grey; the legs of a flesh colour. This species resides in the fens the whole year; breeds there, and hatches about eight or nine young, which are often taken, easily tamed, and esteemed most excellent meat, superior to the domestic geese. The old geese which are shot, are plucked, and sold in the market as fine tame ones; and readily bought, the purchaser being deceived by the size, but their flesh is coarse. Towards winter they collect in great flocks, but in all seasons live and feed in the fens. The grey lag is the origin of the domestic goose; it is the only species that the Britons could take young, and familiarize:

the other two never breed here, and migrate during summer. The mallard comes within the same description, and is the species to which we owe our tame breed of ducks: both preserve some of the marks of their wild state; the goose, the whiteness of the coverts of the tail and vent feathers; the drake, its curled feathers.—Tame geese are of vast longevity. Mr Willughby gives an example of one that attained to 80 years. They are kept in great multitudes in the fens of Lincolnshire: a single person will have 1000 old geese, each of which will rear seven; so that towards the end of the season he will become master of 8000. During the breeding season these birds are lodged in the same houses with the inhabitants, and even in their very bed-chambers: in every apartment are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge divided from the other, which it keeps possession of during the time of sitting. A person, called a *gozzard*, i. e. *goose-herd*, attends the flock, and twice a-day drives the whole to water; then brings them back to their habitations, helping those that live in the upper stories to their nests, without ever misplacing a single bird. The geese are plucked five times in the year: the first plucking is at Lady-day, for feathers and quills; and the same is renewed, for feathers only, four times more between that and Michaelmas. The old geese submit quietly to the operation, but the young ones are very noisy and unruly. If the season proves cold, numbers of them die by this barbarous custom. Vast numbers of geese are driven annually to London to supply the markets; among them, all the superannuated geese and ganders,

which, by a long course of plucking, prove uncommonly tough and dry.

The *bean-geese* is two feet seven inches in length; in extent, four feet eleven. The bill, which is the chief distinction between this and the former, is small, much compressed near the end, whitish, and sometimes pale red in the middle, and black at the base and nail: the head and neck are cinereous brown, tinged with ferruginous; breast and belly, dirty white, clouded with cinereous; the back of a plain ash colour; feet and legs of a saffron colour; claws black. This species arrives in Lincolnshire in autumn; and is called the *bean-geese*, from the likeness of the nail of the bill to a horse-bean. They always light on corn-fields, and feed much on the green wheat.

They never breed in the fens; but all disappear in May. They retreat to the sequestered wilds of the north of Europe; in their migration they fly a great height, cackling as they go. They preserve a great regularity in their motions; sometimes forming a straight line; at others, assuming the shape of a wedge, which facilitates their progress, for they cut the air easier in that form than if they flew pell-mell.

8. The erythropus, or laughing-geese of Edwards, is a native of Europe and America. The length of this species is about two feet four; the extent four feet six; the bill elevated, of a pale yellow colour, with a white ring at the base; the forehead is white; the breast and belly are of a dirty white, marked with great spots of black; and the legs yellow.

These visit the fens and other parts of England during winter, in small flocks; they keep always in marshy places, and never frequent the corn-lands. They disappear in the earliest spring, and none are seen after the middle of March. Linnaeus makes this goose the female of the *bernacle*; but Mr Pennant thinks his opinion not well founded.

The *bernacle* (*erythropus mar*, Lin.) is two feet one inch in length; the breadth four feet five inches; the bill is black; the forehead and cheeks are white; from the bill to the eyes, there is a black line; the hind part of the head, the whole neck, and upper part of the breast and back, are of a deep black; the tail is black, the legs of the same colour, and small.

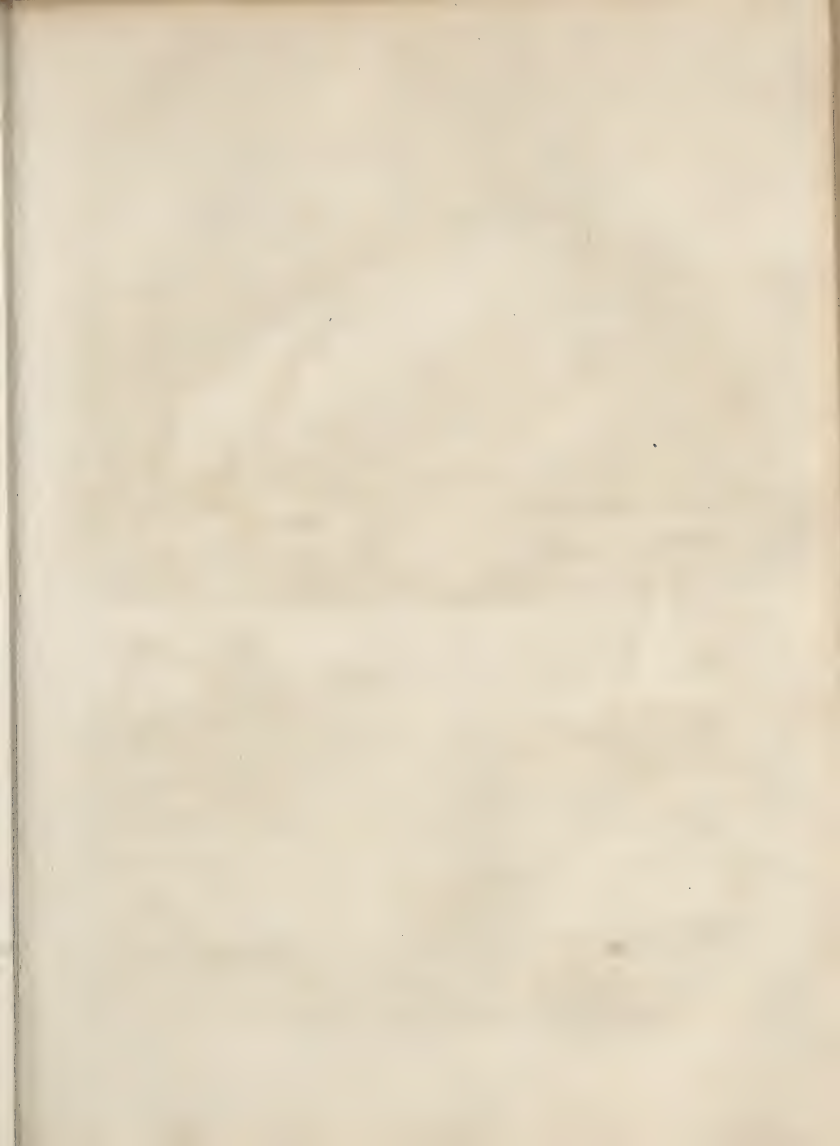
These birds appear in vast flocks during winter, on the north-west coasts of this kingdom: they are very shy and wild; but on being taken, grow in a few days as familiar as our tame geese. In February they quit our shores, and retire as far as Lapland, Greenland, and even Spitzbergen, to breed.

They live to a great age: the Rev. Dr Buckworth of Spalding, had one which was kept in the family above 32 years, but was blind during the two last; what its age was when first taken, was unknown.

These are the birds that about 200 years ago were believed to be generated out of wood, or rather a species of shell that is often found sticking to the bottoms of ships, or fragments of them; and were called *tree-geese* *. These were also thought by some writers to have been the *chenalopeces* of Pliny; they should have said *chenerotes*, for those were the birds which that naturalist said were found in Britain: but as he has scarce left us any description of them, it is difficult to say which species he intended. Mr Pennant imagines it to be the following; which is far inferior in size to the wild-
goose,

Anas;
or
swan, goose,
and duck.
Plate XII.
fig. 2.

* See *Lepus*.





*Fig. 2. ANAS ANSER,
the Wild-geese, or Bean-geese.*



*Fig. 3. ANAS BOSCHAS,
the common Wild-duck, or Mallard. Male & Female.*



*Fig. 4.
ANAS SPONSA,
or Swan-duck.*



*Fig. 5. ANAS RUFÆ,
or Ruddy duck.*



*Fig. 6. ANAS MARILA, or
Mare's duck.*



Anas;
or
swan, goose,
and duck.

goose, and very delicate food; in both respects suiting his account of the *cheneros*.

9. The bernicle, is of a brown colour; with the head, neck, and breast, black; and a white collar. The birds of this species frequent our coasts in the winter; in Ireland they are called *bernacles*, and appear in great quantities in August, and leave it in March. They feed on a sort of long grass growing in the water; preferring the root and some part above it, which they dive for, bite off, and leave the upper part to drive on shore. They abound near Londonderry, Belfast, and Wexford; are taken in flight-time, in nets placed across the rivers; and are much esteemed for their delicacy. Mr Willughby, Mr Ray, and Mr Brisson, very properly describe the bernacle and brent as different species; but Linnaeus makes these synonymous, and describes the true bernacle as the female of the white-fronted wild-geese.

10. The canadensis is brown; its neck and head are black, and the throat is white. It is a native of Canada.

11. The *cœrulefcens*, is greyish above, and white underneath; the covert-feathers of the wings and back are bluish. It is the blue-winged goose of Edwards, and a native of Canada.

12. The *molissima*, or eider-duck, is double the size of the common duck, has a cylindrical bill, and the wax is divided behind, and wrinkled. The feathers, which are very soft and valuable, fall off during incubation. The male is white above, but black below and behind: the female is greenish. This species is found in the Western Isles of Scotland, particularly on Oranfa, Barra, Rona, and Heiskir, and on the Farn isles; but in greater numbers in Norway, Iceland, and Greenland; from whence a vast quantity of the down, known by the name of *eider* or *edder*, which these birds furnish, is annually imported: its remarkably light, elastic, and warm qualities, make it highly esteemed as a stuffing for coverlets, by such whose age or infirmities render unable to support the weight of common blankets: This down is produced from the breast of the birds in the breeding season. It lays its eggs among the stones or plants, near the shore; and prepares a soft bed for them, by plucking the down from its own breast: the natives watch the opportunity, and take away both eggs and nest: the duck lays again, and repeats the plucking of its breast: if she is robbed after that, she will still lay; but the drakes must supply the down, as her stock is now exhausted: but if her eggs are taken a third time, she wholly deserts the place.

Mr Pennant, when on the Farn isles, found the ducks fitting; and took some of the nests, the base of which were formed of sea-plants, and covered with the down. After separating it carefully from the plants, it weighed only three quarters of an ounce; yet was so elastic as to fill a larger space than the crown of the greatest hat. These birds are not numerous on the isles; and it is observed that the drakes keep on those most remote from the fitting places. The ducks continue on their nests till you come almost close to them; and when they rise, are very slow fliers. The number of eggs in each nest are from three to five, warmly bedded in the down; of a pale olive colour; and very large, glossy, and smooth.

13. The marila, or scaup-duck, is less than the com-

mon duck. The bill is broad, flat, and of a greyish blue colour; the head and neck are black, glossed with green; the breast is black; the back, the coverts of the wings, and the scapulars, are finely marked with numerous narrow transverse bars of black and grey; the legs are dusky. Mr Willughby acquaints us, that these birds take their name from feeding on scaup, or broken shell-fish; they differ infinitely in colours, so that in a flock of 40 or 50 there are not two alike.

14. The *moschata*, or Muscovy duck of Ray, has a naked papillous face, and is a native of India.

15. The *bahamensis*, or Bahama duck, is grey, with a lead-coloured bill. It has a tawny spot on the sides, and a green yellowish spot on the wings. It is a native of Bahama.

16. The *albaea*, or little black and white duck, has a black back and wings; the head is bluish, and white on the hinder part. It is a native of America.

17. The *clypeata*, or shoveler of Ray, has the end of its bill broad, rounded, and furnished with a small hook. It is found near the European shores.

18. The *strepera*, or gad-wall, has the wings variegated with black, white, and red. It frequents the fresh waters of Europe.

19. The *bucephala*, or lesser duck of Catesby, has the back and wings black; and the head, both above and below, is interperfed with shining silky feathers. It frequents the fresh waters of North America.

20. The *clangula*, or golden-eye of Ray, is variegated with black and white, and the head is interperfed with blackish green feathers; it has a white spot near the mouth; and the eyes are of a shining gold-colour. It dives much in quest of shell-fish. It frequents fresh water as well as the sea, being found on the Shropshire meres during winter.

21. The *rustica*, is brownish, or ash-coloured, with a white spot on the ears and wings. It is a native of North America.

22. The *perspicillata*, or great black duck, is white on the top of the head and of the neck; and has a black spot on the bill, immediately behind the nostrils. It is a native of Canada.

23. The *glaucon*, or greater wild-duck of Ray, has the iris of the eyes yellow, a grey head, and white collar. It frequents the northern shores of Europe.

24. The *penelopis*, or widgeon of Ray, has a sharpish tail, black below; the head is brown, and the forehead white. It inhabits the marshy parts of Europe.

25. The *acuta*, pin-tail, or sea-pheasant of Ray, has a long acuminate tail, black below, with a white line on each side of the back part of the head. It is a native of Europe. Mr Hartlib, in the appendix to his *legacy*, tells us, that these birds are found in great abundance in Connaught in Ireland, in the month of February only; and that they are much esteemed for their delicacy.

26. The *galialis*, or long-tailed duck, is inferior in size to the former. The bill is short, black at the tip and base, orange-coloured in the middle; the cheeks are of a pale brown; the hind-part of the head, and the neck both before and behind, are white; the breast and back are of a deep chocolate colour; the four middle feathers of the tail are black, and two of them near four inches longer than the others, which are white: the legs dusky. These birds breed in the most north-

Anas;
or
swan, goose,
and duck.

Anas;
or
swan, goose,
and duck.

Anas,
Anastatica.

ern parts of the world; and only visit our coasts in the severest winters.

27. The ferina, pochard, or red-headed widgeon of Ray, has a lead-coloured bill: the head and neck are of a bright gay colour: the breast and part of the back where it joins the neck, are black: the coverts of the wings, the scapulars, back and sides under the wings are of a pale grey, elegantly marked with narrow lines of black: the tail consists of twelve short feathers, of a deep grey colour: the legs are lead coloured: and the irides of a bright yellow, tinged with red. The head of the female is of a pale reddish brown: These birds frequent fresh water as well as the sea; and being very delicate eating, are much fought for in the London markets, where they are known by the name of *duu birds*.

28. The querquedula, garganty, or first teal of Aldrovandus, has a green spot on the wings, and a white line above the eyes. It frequents the fresh waters of Europe. In many places it is called the *summer-teal*.

29. The creca, or common teal, has a green spot on the wings, and a white line both above and below the eyes. It frequents the fresh waters of Europe. This species is to be met with in Duddington-loch, a fresh-water lake, within a mile of Edinburgh.

30. The hiftrionica, or dusky-spotted duck of Edwards, is of a brown colour, variegated with white and blue; has a double line on the ears and temples; the collar is white, and there is a white streak on the neck. It is a native of America.

31. The minuta, or little white and brown duck of Edwards, is of a greyish colour, with white ears, and the prime feathers of the wings blackish. It is a native of Canada.

32. The circia, or summer-teal of Ray, with the wings variegated with white spots, a white line above the eyes, and the beak and feet of an ash-colour. It frequents the lakes of Europe.

33. The autumnalis, or red-billed whistling duck of Edwards, is of a grey colour, with the prime feathers of the wings, the tail, and belly black; and the area of the wings yellow and white. It is a native of America.

34. The boschas, or common wild-duck of Ray; the intermediate tail-feathers of the drake are turned backward, and the bill is frail. It frequents the lakes of Europe. This duck feeds upon frogs and several sorts of insects.—The wild ducks pair in the spring; build their nests among rushes or helth, near the water; and lay from 10 to 16 eggs. At moulting-time, when they cannot fly, they are caught in great numbers. They abound particularly in Lincolnshire, the great magazine of wild-fowl in this kingdom; where prodigious numbers are taken annually in the decoys *. Birds with flat bills, that find their food by groping, have three pair of nerves that extend to the end of their bills: these nerves are remarkably conspicuous in the head and bill of the wild-duck; and are larger than those of a goose, or any other bird yet known: This is the reason they grope for food more than any other bird whatever.—The common tame species of ducks take their origin from these, and may be traced to it by unerring characters. The drakes, howsoever they vary in colours, always retain the curled feathers of the tail, and both sexes the form of the bill, of the wild

kind. Nature sports in the colours of all domestic animals; and for a wife and useful end, That mankind may the more readily distinguish and claim their respective property.

35. The adunca, or hook-billed domestic duck of Ray, has the same characters with the boschas, excepting that the bill is crooked.

36. The galericulata, or Chinese teal of Edwards, has a hanging crest; and on the hinder part of the back, on both sides, there is a crooked, flat, elevated feather; the crest is green and red; and the back is brown, and spotted with blue; and erect feathers on the back are red and blunt; one edge of the immort wing-feather, when the wings are shut, is raised over the back, and is red, and like a sickle before. It is a native of China.

37. The sponfa, or summer-duck of Catelby, has a Plate XII. depending green crest, variegated with blue and white; fig. 4. the back is likewise variegated with blue and white; the breast is grey, and spotted with white; and the throat is white. It is a native of North America.

38. The arborea, or black-billed whistling-duck of Plate XI. Edwards, is of a reddish brown colour, with a sort of fig. 3. crest on the head; the belly is spotted with black and white. It is a native of America. Sloane informs us, that this duck perches on trees; that it is about 20 inches long, from the end of the bill to the point of the tail; and that it makes a kind of whistling noise, from which circumstance it has received its name.

39. The fuligula, or tufted duck of Ray, has a hanging crest, a black body, and the wings and belly spotted with white. It is a native of Europe. The male of this species disappears during the incubation of the female.

40. The rufa, or ferruginous duck, described by Mr Pennant from one which was killed in Lincolnshire. The bill is long and flattened, rounded a little at fig. 5. the base, serrated along the edges of each mandible, and furnished with a nail at the end of the upper. The colour, a pale blue. The head, neck, and whole upper part of the bird, are of an agreeable reddish brown; the throat, breast, and belly, of the same colour, but paler, the legs of a pale blue, but the webs of the feet black.—This species is not mentioned by any other writer, except Linnaeus, who took his description from Rudbeck's paintings; and adds, that it is found, tho' rarely, in the Swedish rivers.

ANASARCA, a species of dropsy. See MEDICINE, n° 760, 761.

ANASTASIS, a term among ancient physicians, for a rising up to go to stool. It also signifies the passage of any humour, when expelled from one part, and obliged to remove to another.

ANASTASIUS, surnamed BIBLIOTHECARIUS, a Roman abbot, library-keeper of the Vatican, and one of the most learned men of the ninth century, assisted in 869 at the fourth general council, the acts and canons of which he translated from the Greek into Latin. He also composed the lives of several popes, and other works; the best edition of which is that of the Vatican.

ANASTATICA, the ROSE of JERICHO; a genus of the filiculosa order, belonging to the tetradynamia class of plants.—Of this genus there are two

Species. 1. The syriaca, a native of Syria, is not cultiva-

Plate XII.
fig. 3.

* See Decoy.

Anatolica
|
Anathema.

Anathema
|
Anatolia.

cultivated or known in Britain. 2. The hierochuntica is a native of the sandy parts of Palestine and the Red sea. It is a low annual plant, dividing into many irregular woody branches near the root. At each joint is placed a single, oblong, hairy leaf; and at the same places come out small single flowers, of a whitish green colour, composed of four leaves placed in the form of a cross. These are succeeded by short wrinkled pods, having four small horns; these open into four cells, in each of which is lodged a single brown seed.—When the seeds of this plant are ripe, the branches will draw up and contract; so that the whole plant forms a kind of ball or globular body, which will expand on laying it a short time in warm water. This property it retains for many years, on which account it is preserved as a curiosity by some people. From this property the monks have given it the name of *Rosa Mariæ*, pretending that the flowers open on the night in which our Saviour was born.

Culture. This plant is propagated by seeds, which should be sown in the beginning of March, in a moderate hot-bed in pots, in which the plants are designed to remain. When they come up, the plants should be thinned, leaving them about six inches asunder, and observing to keep them clear of weeds, which is all the care they require. If the season proves favourable, they will flower in August; but unless the autumn proves warm and dry, they will not perfect their seeds in Britain.

ANASTOMOSIS, in anatomy, the opening of the mouths of vessels, in order to discharge their contained fluids. It is likewise used for the communication of two vessels at their extremities; as the inoculation of a vein with a vein, of an artery with an artery, or of an artery with a vein.

ANASTOMATICS, medicines supposed to have the power of opening the mouths of the vessels, and promoting the circulation; such as decoibruent, cathartic, and sudorific medicines.

ANASTROPHE, in rhetoric and grammar, denotes the inversion of the natural order of the words: such is, *saxa per et scopulos*, for *per saxa et scopulos*.

ANATHÉMA, among ecclesiastical writers, imports whatever is set apart, separated, or divided; but

is most usually meant to express the cutting off a person from the privileges of society, and communion with the faithful.

The anathema differs from excommunication in the circumstances of being attended with curses and execrations. It was practised in the primitive church against notorious offenders; and the form of that pronounced by Synecius against one Andronicus, is as follows: "Let no church of God be open to Andronicus, but let every sanctuary be shut against him. I admonish both private men and magistrates, to receive him neither under their roof, nor to their table; and priests more especially, that they neither converse with him living, nor attend his funeral when dead."

Several councils also have pronounced anathemas against such as they thought corrupted the purity of the faith, and their decisions have been conceived in the following form: *Si quis dixerit, &c. anathema sit.*

There are two kinds of anathemas, the one judicial, and the other abjuration. The former can only be denounced by a council, a pope, or a bishop; the latter makes a part of the ceremony of abjuration, the convert being obliged to anathematize the hereby he abjures.

ANATHÉMA, in heathen antiquity, was an offering or present made to some deity, and hung up in the temple. Whenever a person left off his employment, it was usual to dedicate the tools to the patron-deity of the trade. Persons too who had escaped from imminent danger, as shipwreck and the like, or had met with any other remarkable instance of good fortune, seldom failed to testify their gratitude by some present of this kind.

ANATHÉMA likewise denotes Christian offerings, otherwise called donations. See **DONATIONS**.

ANATHOTH, a hamlet of Palestine, very near Jerusalem, (Josephus;) about three miles and a half to the north; the ruins of which are still to be seen. It was the birth-place of the prophet Jeremiah, and one of the Levitical towns in the tribe of Benjamin.

ANATIFERA CONCHA, the trivial name of a species of the lepas, a testaceous animal. See **LEPAS**.

ANATOLIA. See **NATOLIA**.

A N A T O M Y,

THE art of dissecting, or artificially separating and taking to pieces, the different parts of the human body, in order to an exact discovery of their situation, structure, and economy.—The word is Greek, *αντομία*; derived from *αντιστομω*, to dissect, or separate by cutting.

INTRODUCTION.

§. 1. History of Anatomy.

This art seems to have been very ancient; though, for a long time, known only in an imperfect manner.—It probably first took its origin from the custom of sacrificing animals to the Deity; and as some parts only were appointed for sacrifice, and others for the use of the priests, those who were concerned in performing this religious ceremony behaved to be as much masters of anatomy as to distinguish the one part from the other.

It was indeed impossible that any number of animals could be slaughtered, either for sacrifice or food, but those who performed the butcher's part behaved to be acquainted with the general situation of the viscera; and accordingly we find, by the directions given to the Jews concerning their sacrifices, that these things were well known in the time of Moses. It is also probable, that as for a long time every man was butcher for himself, the slight knowledge of anatomy which butchers can acquire was pretty general in every nation.

By viewing the bodies of slaughtered animals, however, only a knowledge of *Comparative Anatomy*, as it is called, could be acquired. The knowledge of the internal parts of the human body might possibly originate from the barbarous custom of human sacrifices on certain occasions. This made it necessary for the priests

to acquire some knowledge of the internal structure of the human body, and they would not want opportunities from those slain in battle, or torn by wild beasts: accordingly we find in Homer's *Iliad* some degree of anatomical knowledge displayed, by his accurate details of some of the viscera wounded by weapons passing from certain external parts of the body.

The first hints we have of anatomy being adopted as a science or part of natural philosophy, are, That Thales of Miletum, and Pythagoras, about 700 years before Christ, made it a part of their studies.—An hundred years after this, Empedocles, in a little fragment preserved by Galen, discovers considerable anatomical knowledge, and is thought to have prevented Fallopius in the discovery of the cochlea and tube of the ear.

Alcmaeon of Crotona, a disciple of Pythagoras, is thought to have been the first who dissected animals with a view to learn their internal structure. This was done by Democritus of Abdera, with a philosophical, and by Hippocrates with a medical view, about 500 years before Christ.—Dioscorus the Carystian is said to have been the first who wrote the method and order of dissecting the parts of animals; but his works are now lost.—The next who had any reputation in anatomy was Praxagoras the Coan; of whom all we know is, that he distinguished the veins from the arteries, and believed that the latter became nerves as they grew smaller.

It is probable that the Greeks learned their knowledge of the arts from the eastern nations, as all the Grecian worthies esteemed it one of the best parts of their education to travel into those parts.—Egypt seems to have been originally a great seminary of learning. Under the first Ptolemies, Soter and Philadelphus, a school was erected at Alexandria, where, among other sciences, anatomy was publicly taught: the kings were sometimes present at the dissections of human bodies, and brutes were furnished by their command. Herophilus and Erasistratus were the successors of two of the first masters in this school, and each of them is said to have dissected several hundred bodies, from which probably the report arose of their having dissected living men. Erasistratus described the lacteal vessels of a kid, and the true origin and use of the nerves, in which last discovery Herophilus of Carthage has shared with him. By some he has been supposed to have known the circulation of the blood; and we are certain that he accounted for digestion by the mechanical action and pressure of the stomach, as some moderns have done. The works of these great men are lost, and all we know of them is from little scraps of improvements interspersed in the works of Galen.

Among the Romans, though it is probable they had physicians and surgeons from the foundation of the city, yet we have no account of any of these applying themselves to anatomy for a very long time. Archagathus was the first Greek physician established in Rome, and he was banished the city on account of the severity of his operations.—Asclepiades, who flourished in Rome 101 years after Archagathus, in the time of Pompey, attained such a high reputation as to be ranked in the same class with Hippocrates. He seemed to have some notion of the air in respiration acting by its weight; and in accounting for digestion, he supposed the food to be no farther changed than by a comminution into

extremely small parts, which being distributed to the several parts of the body, is assimilated to the nature of each. One Cassius, commonly thought to be a disciple of Asclepiades, accounted for the right side of the body becoming paralytic on hurting the left side of the brain, in the same manner as has been done by the moderns, viz. from the crossing of the nerves from the right to the left side of the brain.

From the time of Asclepiades to the second century, physicians seem to have been greatly encouraged at Rome; and in the writings of Celsus, Rufus, Pliny, Cælius Aurelianus, and Aretæus, we find several anatomical observations, but mostly very superficial and inaccurate. Towards the end of the second century lived Claudius Gallenus Pergamus, whose name is so well known in the medical world. He applied himself particularly to the study of anatomy, and did more in that way than all that went before him. He seems, however, to have been at a great loss for human subjects to operate upon; and therefore his descriptions of the parts are mostly taken from brute animals. His works contain the fullest history of anatomists, and the most complete system of the science, to be met with any where before him, or for several centuries after; so that a number of passages in them were reckoned absolutely unintelligible for many ages, until explained by the discoveries of succeeding anatomists.

About the end of the fourth century, Nemesis bishop of Emisa wrote a treatise on the nature of man, in which it is said were contained two celebrated modern discoveries; the one, the uses of the bile, boasted of by Sylvius de la Boe; and the other, the circulation of the blood. This last, however, is proved by Dr Friend, in his *History of Physic*, p. 229. to be falsely ascribed to this author.

The Roman empire beginning now to be oppressed by the barbarians, and sunk in gross superstition, learning of all kinds decreased; and when the empire was totally overwhelmed by those barbarous nations, every appearance of learning was almost extinguished in Europe. The only remains of it were among the Arabians in Spain and Asia. They applied themselves chiefly to the study of physic; but as the Mahometan law, like that of the Jews, forbid its subjects to touch dead bodies, anatomy could be but little improved by them. Avicenna, however, applied himself to read and understand the works of Galen. By dissection, he found out what is commonly ascribed to Fallopius, namely, the muscles attollens palpebram superiorem.

By the intercourse of the Europeans next to Spain with the Arabians, learning began to be again introduced; and in the eleventh century, the school of Salerno in Sicily made a considerable figure in medicine. The gross ignorance and superstition of those days, however, prevented for a long time any improvements, and nothing was taught for two centuries afterwards but to understand the Arabian doctors. Anatomical improvements were particularly retarded by its being imagined a crime to dissect a human body; and this opinion prevailed till the 16th century. The emperor Charles V. ordered a consultation to be held by the divines of Salamanca, in order to determine whether or not it was lawful in point of conscience to dissect a dead body. In Muscovy, till very lately, both anatomy, and the use of skeletons were forbidden, the first as inhuman, and

and the latter as subservient to witchcraft.

Mundinus was the first European author who joined dissections to the authority of Galen and the Arabs. He flourished in the beginning of the 14th century, and his system was in such high reputation as to be the only one taught in the schools for a good number of years. In the university of Padua particularly, the professors were tied down by an express order of the academy to teach this book and no other.

In the beginning of the 15th century, learning revived considerably in Europe, and particularly physic, by means of copies of the Greek authors brought from the sack of Constantinople; after which the number of anatomists and anatomical books increased to a prodigious degree.—The Europeans becoming thus possessed of the ancient Greek fathers of medicine, were for a long time so much occupied in correcting the copies they could obtain, studying the meaning, and commenting upon them, that they attempted nothing of their own, especially in anatomy.

Towards the end of this century, Jacobus Berengarius Carpus, became the restorer of anatomy and surgery at Bononia in Italy. He says that he had dissected above an hundred dead bodies; which procured him the same character that had formerly been given to Herophilus and Erasistratus, namely, that of dissecting living men.—He published two anatomical works; the one intitled *Isgogæ*; and the other, commentaries on *Mundinus*, in which he corrected some erroneous descriptions; and added several discoveries of his own.

For some time the study of anatomy seems to have been peculiar to Italy, and several treatises were published on this subject by the Italians before any thing of a similar kind was produced in any other nation; but about the year 1536, Johannes Guinterius of Anderon, who had taught anatomy for some years at Paris, published his Anatomical Institutions. He was the first anatomist who gave a full and exact description of the muscles: he affirmed, that the muscles which surround the neck of the bladder consisted of transverse fibres; that they had several functions, such as shutting the bladder, and, after the emission of the urine, evacuating what is left in the passage.

In 1543, Andreas Vesalius of Brussels published his anatomy; which was of the utmost service, not only by the many important discoveries he made, but by his daring to correct Hippocrates, Galen, and the Arabians; which paved the way for others to rid themselves of the slavery to these authors, which universal custom had imposed upon them. His descriptions are minute, especially of the bones and muscles; in which he not only outdid all that went before him, but is scarce to be equalled by any modern author. His figures were also esteemed master-pieces of painting; though they would probably have been more serviceable to young anatomists, had they been represented in a flaccid state, as they are by Eustachius, and as they are to be seen in a dead body, than when represented in a strong state of action. He was the first anatomist that professed for a salary.

The criticisms on Galen and the ancients published by Vesalius when only 28 years of age, could not fail of procuring him a number of enemies; which, however, increased, instead of diminishing, his reputation. Among the rest, Jacobus Sylvius of Amiens who had been Vesalius's instructor, endeavoured to decry him;

and besides thundering against him in his colleges, he wrote a scurrilous treatise against Vesalius, and in defence of Galen, which he entitled *Calumniarum Vesalii repulso*. Besides this he published several other anatomical treatises. He has been particularly serviceable by imposing names on the muscles, most of which are retained to this day. Formerly they were distinguished by numbers, which were differently applied by almost every author.

In 1561, Gabriel Fallopius, professor of anatomy at Padua, published a treatise of anatomy under the title of *Observationum Anatomice*. This was designed as a supplement to Vesalius; many of whose descriptions he corrects, though he always makes mention of him in an honourable manner. These criticisms, however, were not well relished by Vesalius, though he was obliged to own himself handsomely dealt by. He published an answer, under the title of *Observationum Fallopii Examen*. Fallopius made many great discoveries, and his book is well worth the perusal of every anatomist.

In 1563, Bartholomæus Eustachius published his *Opuscula Anatomica* at Venice which have ever since, been justly admired for the exactness of the descriptions, and the discoveries contained in them. He published afterwards some other pieces, in which there is little of anatomy; but never published the great work he had promised, which was to be adorned with copper-plates representing all the parts of the human body. These plates, after lying buried in an old cabinet for upwards of 150 years, were at last discovered, and published, in the year 1714, by Lancini the pope's physician; who added a short explanatory text, because Eustachius's own writing could not be found.

From this time to the year 1628, though the number of anatomical authors was very much increased, there seems to have been no remarkable discovery made: only Andreas Libavius, tho' not properly an anatomist, ought not to be passed over in silence; because in 1616, from some unknown Paracelsian, he describes a method of transfusing the blood of one animal into another, as a cure for various diseases. But this year (1628) was rendered remarkable by the discovery of the circulation of the blood. This important phenomenon was first observed and demonstrated by Dr William Harvey, who now published his observations. Numbers of opponents immediately appeared; but he had the happiness in his own life to see them all give up their cause, and the whole medical world embrace his doctrine. Some, indeed have endeavoured to rob him of the honour of this important discovery, by pretending that he received it from some cotemporary who durst not publish it himself, as it would have been reckoned a mortal heresy in some countries. This, however, was never proved.

We now consider anatomical knowledge as approaching to its *non plus ultra*.—So many and so great discoveries were already made, that only the *minutia* remained to be discussed by succeeding anatomists. Improvements, however, were still going on. In 1642, Wirtfungus, or Virtungus, discovered the pancreatic duct; but he did not live to publish his treatise on this discovery, being killed by a bravo at his own door in Padua.—In 1651, or 1652, the lymphatic vessels were discovered by Thomas Bartholine; but this honour was also claimed by Olaus Rubick the Swede, and by the cotemporary English writers ascribed to
th. it.

their countryman Jolivius.

Numberless other discoveries, though of the less important kind, continued to be made.—In 1660, or soon after, Marcellus Malpighius began to outdo all his predecessors in the exactness of his descriptions, and the new discoveries he made in the structure of the parts. What gave him so much the advantage over others was his extreme patience, and his methods of preparing the parts, particularly by long maceration. He had also the advantage of microscopes, which before his time were either never used, or in a very inaccurate manner. At the same time flourished Laurentius Bellinus at Florence, and was the first who introduced mathematical reasoning in physic. In 1662, Simon Pauli published a treatise *de Albandis Ossibus*. He had long been admired for the white skeletons he prepared; and at last discovered his method, which was by exposing the bones all winter to the weather.

Johannes Swammerdam of Amsterdam also published some anatomical treatises; but was most remarkable for his knowledge of preserving the parts of bodies entire for many years, by injecting their vessels. He also published a treatise on respiration; wherein he mentioned his having figures of all the parts of the body, as big as the life, cut in copper, which he designed to publish, with a complete system of anatomy. These, however, were never made public by Swammerdam; but, in 1683, Gothofridus Bidloo, professor of anatomy at Leyden, published a work intitled *Anatomia Corporis Humani*, where all the parts were delineated in very large plates almost as big as the life. Mr Cowper, an English surgeon, bought 300 copies of these figures; and in 1698, published them, with an English text, quite different from Bidloo's Latin one; to which were added letters in Bidloo's figures, and some few figures of Mr Cowper's own. To this work Cowper's name was prefixed, without the least mention of Bidloo, except on purpose to confute him. Bidloo immediately published a very ill-natured pamphlet, called *Gulielmus Cowperus citatus coram tribunali*; appealing to the royal society, how far Cowper ought to be punished as a plagiarist of the worst kind, and endeavouring to prove him an ignorant deceitful fellow. Cowper answered him in his own style, in a pamphlet called his *Vindicta*; endeavouring to prove, either that Bidloo did not understand his own tables, or that they were none of his. This last is most probable; and many people believe that these are the tables promised by Swammerdam, and which Bidloo had got from his widow.

Soon after, Isbrandus Diembroeck, professor of anatomy at Utrecht, began to appear as an author. His work contained very little original; but he was at great pains to collect from others whatever was valuable in their writings, and his system was the common standard among anatomical students for many years.

About the same time, Antonius Liewenhoeck of Delft improved considerably on Malpighius's use of microscopes, and supplied what was wanting in Harvey's demonstration of the true circular motion of the blood. He was also the author of an hypothesis concerning the different texture of the blood and serum; but herein he is found to have been mistaken.

Frederic Ruyfch first appeared in print in 1665, and died only in 1730, occasionally publishing anatomical pieces during a course of 65 years. He was for a great

many years famous for his method of injecting the most subtle vessels of the body, and for preserving all the parts in their natural colour and texture; both of which arts he is said to have received from Swammerdam, tho' he himself protests solemnly that he found them out by his own industry.

It would be in a manner impossible to give an account of all the authors that have contributed since the beginning of the present century to bring the science of anatomy to that state of perfection in which it now is. The writings of Keil, Douglas, Cheffelden, Winflow, &c. are too well known to need description. The latter is generally recommended as a standard for the students of anatomy. It is also superfluous to mention the reputation which Dr Monro at Edinburgh, and Dr Hunter at London, have deservedly acquired, on account of their anatomical knowledge. We shall only take notice of two remarkable improvements, not in the science itself, but in the method of teaching it, that have been made since the commencement of this century. The one is, by Joannes Baptista Bianchi, professor first at Bononia, and afterwards at Turin. He shewed his scholars a body entire, so prepared that he took off one part from another, and finished a complete system of anatomy before he had done: then he artificially joined all the parts together for a new demonstration, so that it could not be known they were ever separated. The other is the art of imitating all the parts of the body in wax; which was brought to the utmost perfection by Georgius des Noves, vel Novesias, professor of anatomy at Bononia; and figures of this kind were publicly shewn at London and Paris.

§. 2. Plan of the following Treatise.

The etymology of the word *anatomy*, as above given, implies simply *dissection*; but by this term something more is usually understood.

It is every day made use of to express a knowledge of the human body; and a person who is said to understand anatomy, is supposed to be conversant with the structure and arrangement of the different solid parts of the body.

It is commonly divided into Anatomy, properly so called; and Comparative Anatomy: the first of these is confined solely to the human body; the latter includes all animals, so far as a knowledge of their structure may tend to perfect our ideas of the human body*.

The term *anatomy* may also have another and more extensive signification: it may be employed to express, not only a knowledge of the structure and disposition of the parts, but likewise of their economy and use. Considered in this light, it will seldom fail to excite the curiosity of people of taste, as a branch of philosophy; since, if it is pleasing to be acquainted with the structure of the body, it is certainly more so to discover all the springs which give life and motion to the machine, and to observe the admirable mechanism by which so many different functions are executed.

The human body is composed of solid and fluid parts. We shall not satisfy ourselves with giving a description of the former alone; but we shall likewise speak of the nature of the fluids, and of the reciprocal action of both upon each other.

* See Comparative Anatomy.

PART I. OSTEOLOGY.

CHAP. I.

Of the BONES in General.

WE begin with the bones, which may be considered as the great support of the body, tending to give it shape and firmness. But before entering into the detail of each particular bone, it will be necessary to describe their composition and connections, and to explain the nature of the different parts which have an immediate relation to them; as the cartilages, ligaments, periosteum, marrow, and synovial glands.

x
Of the composition of the bones.

a, The bones are of a firm and hard substance, of a white colour, and perfectly insensible. They are the most compact and solid parts of the body; and serve for the attachment or support of all the other parts.

b, Three different substances are usually distinguished in them; their exterior or *bony* part, properly so called; their *spongy cells*; and their *reticular substance*. The first of these, is formed of many laminae, or plates, composing a firm, hard, substance. The *spongy*, or *cellular* part, is so called, on account of its resemblance to a sponge, from the little cells which compose it. This substance forms almost the whole of the extremities of cylindrical bones. The *reticular* part is composed of fibres, which cross each other in different directions: this net-work forms the internal surface of those bones which have cavities.

c, The flat bones, as those of the head, are composed only of the laminae and the cellular substance: this last is usually found in the middle of the bone, dividing it into two plates; and is there called *diploe*.

d, Gagliardi, who pretended to have discovered an infinite number of clavicle, or bony processes, which he describes as traversing the laminae to unite them together, has endeavoured to support this pretended discovery by the analogy of bones to the bark of trees, in which certain woody nails have been remarked: but this opinion has not been confirmed by any certain observation. The resemblance of bones to trees has, with more probability, been observed in their formation. In bones it is by many supposed to arise from layers of the periosteum, which gradually ossify; and it is by the hardening of the albumen (A) in trees that the timber is formed. M. Duhamel, the celebrated academician, has endeavoured to prove the truth of this observation by a great number of facts (B).

e, We usually consider in a bone, its *body* and its *extremities*. The ancients distinguished the body or middle part, by the name of *diaphysis*; and divided the extremities into *apophysis* and *epiphysis*; an *apophysis*, or, as it is more usually termed, process, is an eminence or continuation of the body of the bone; whereas an *epiphysis*, is a part attached to the bone by means of an intervening cartilage. A great number of epiphyses, which in young subjects appear as separate bones, be-

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(A) The albumen is the soft, white substance, which in trees is found between the liber, or inner bark, and the wood.

(B) M. Duhamel, with a view to support his system of ossification, fed different animals with madder and their ordinary food, alternately, during a certain time; and constantly observed, in dissecting their bones, distinct layers of red and white, which corresponded with the length of time they had lived on madder, or their usual aliment. The same trials, however, have been since made with the madder in England, and were found not to correspond with Duhamel's account of its effects.

come, in process of time, so perfectly united to the body of the bone, by the ossification of the cartilage, as not to be distinguished from it in the adult state.

f, Different names are given to the processes of bones, varying according to their figure and size. If a process is large, and of a spherical shape, it is called *caput*, or head; if the head is flattened, it takes the name of *condyle*. Other processes are called *mastoid*, *styloid*, *coracoid*, from their resemblance to a breast, a stiletto, or the beak of a crow. Some are styled *ridges* or *spines*. All these terms are easily understood; we shall however speak of them again, when we consider the bones which have apophyses.

g, There are, in bones, cavities as well as processes: these cavities either extend quite through the bones, or appear only as depressions. The first of these receive the name of *foramina*, or *holes*; and these foramina are sometimes called *canals*, or *conduits*, according to their form and extent. Of the cavities which do not penetrate through the bones, some are formed for the articulations; when these are deep, they are called *cotyloid*; as the great articulating cavity of the thigh, with the os innominatum; *glenae*, or *glenoid*, when they are superficial; as the cavity of the scapula, which receives the head of the os humeri.

h, Of the depressions which are not useful in articulation, the largest, and those which are not equally surrounded by high brims, are called *fossae*. On the contrary, cavities with small apertures, are termed *sinuses*: other depressions take the name of *furrows*; and *sinus-fities*, when they are long and narrow; and there are some called *digital impressions*, from their resemblance to the traces of a finger on soft bodies.

a, We shall abridge this article, which is exceedingly diffuse in the generality of anatomical books; and will endeavour to describe it with all the clearness it will allow.

2
Of the connection of the bones.

b, The skeleton is composed of a great number of bones, which are all so admirably constructed, and with so much affinity to each other, that the extremity of every bone is perfectly adjusted to the end of the bone with which it is connected; and this connection is termed their *articulation*.

c, Articulation is divided into moveable and immoveable. The first of these is named *diarthrosis*, and the second *synarthrosis*.

When a large head is received into a deep cavity, as is the head of the os femoris, it is called *enarthrosis*; *anthrodia*, when a round head is admitted into a superficial cavity; as the articulation of the arm bone, with the scapula. Both these allow motion to all sides.

d, If the articulation permits only flexion and extension, as the articulation of the tibia with the os femoris, it is called *ginglimus*; which properly signifies the hinge of a door, or window. In this the parts of the bones mutually receive and are received.

U u

c, The

e, The *fynarthrosis*, or immoveable articulation of bones, is divided into the *future* and *gomphosis*. In the *future*, the two bones are mutually indented into each other: and of this, the junction of the parietal bones is an example. When the marks of this articulation were more minute, the ancients gave it the name of *harmonia*; but this variety of names seems to be useless. *Gomphosis*, is the fixing one bone into another, as a nail is fixed into a board; and thus the teeth are secured in their sockets. The perfect union or concretion of two bones, is called *symphysis*; as the lower jaw, which in infancy is composed of two distinct bones; but becomes one in a more advanced age, by the ossification of the uniting cartilage.

f, When bones are thus joined by the means of cartilages, the union is styled *synchondrosis*; if by ligaments, *synsacro*.

3
Of the car-
tilages. a, Cartilages are white, solid, smooth, and elastic substances, between the hardness of bones and ligaments; and are usually placed at the extremities of bones.

b, Many of them ossifying in process of time, a greater number are observed in the fetus, than in the adult state: from the same cause the number of bones is greater in young than in old people; because it sometimes happens that a cartilage placed between two bones ossifies; and the three parts, which were before distinct, are united together. This takes place in the sternum.

c, The great use of the cartilages is in the articulations; where, by their smoothness, they facilitate motions which the bones alone could not execute with so

much freedom. They are likewise useful in the formation of the voice, and for the attachment of muscles. The cartilages, as well as the bones, are insensible (c), not because they are destitute of nerves, (being formed, according to M. Duhamel's observations, from the periosteum); but because the closeness of their texture prevents their nerves from receiving, or transmitting any impressions. The soft parts, which become callous or scirrhous, lose (d) their sensibility from a similar cause.

a, The periosteum is a fine (e) membrane, which covers almost all the bones. This membrane, though of a very thin texture, is composed of a great number of layers, which usually ossify one after the other, as the body advances in age.

b, Havers pretended to have discovered, that the periosteum is composed of two sorts of fibres; one of which are placed close to the bone, longitudinally from one end to the other, deriving their origin from the dura mater, which passes out of the cranium in different places; and goes to distribute itself to all the bones in the body. The other order of fibres he supposed to arise from the tendons and muscles. He asserts that they are not longitudinal like the first, but that they follow the same direction as the parts from which they are produced.

c, The periosteum has sanguiferous and lymphatic vessels, and is said to be supplied with nerves (f) from the neighbouring parts: it supports the vessels which go to distribute themselves through the substance of the bones, the periosteum internum, and the marrow.

d, In

(c) In the course of this treatise mention is often made of the sensibility or insensibility of different parts, and it will perhaps not be amiss to give the outlines of a system, which cannot but be interesting to all anatomical readers.—Baron Haller was the first who publicly asserted, that living animals, whole cartilages, ligaments, capulae of the joints, tendons or periosteum were cut, burnt or torn, shewed no signs of uneasiness; and that the wounds of all these parts were cured without any bad symptoms.—In his publication on this subject, he allows feeling to the teeth; but not to the other bones; because they are destitute of nerves.—He ventures to deny sensibility to the marrow, not from any experiments of his own on living animals, but because it is a fatty substance without nerves.—He tells us, that when the dura mater was torn or burnt, with oil of vitriol, the animal seemed insensible of the injury; that with the pia mater it was the same; but that the moment the brain itself was wounded, the body of the animal was exceedingly convulsed—he makes the same conclusions from similar experiments on the peritoneum, pleura, and pericardium, and concerning the mediastinum, from its analogy to them as a membrane. He describes the cornea as insensible, because it nerves cannot be demonstrated, and it is often pierced with a needle without pain.—From a variety of interesting experiments, which he has fully related, he concludes, that all these parts are perfectly insensible; that they have been unjustly accused by physicians as the seat of many painful diseases; and that their insensibility argues their being destitute of nerves—he will not allow the pain and inflammation of the arm, which sometimes are the consequences of bleeding, to proceed from the tendon or aponeurosis in that part; but attributes them to an injury done to the median nerve; or to some branch of the musculo-cutaneous nerve.—He asserts, that the phrenitis has not its seat in the dura mater, or the pleurisy in the pleura.—That in the gout, the skin and subcutaneous nerves, and not the ligaments or capulae of the joints, are the seat of pain.—These are the most important points of the Baron's system, but his opinions have been much controverted; and the late Dr Whytt, in particular, favoured the public with many sensible arguments in refutation of this doctrine, which, however, if not thoroughly received in its full extent, is now in a great measure admitted.—The ingenious Dr Hunter, who appears to have remarked the insensibility of some of these parts before the Baron's publication of his system, suspects that the Baron has gone too far in asserting, that they have absolutely no sense of feeling. He thinks that experiments on brutes are not sufficient to ascertain the more exquisite sensations of the human body; and is of opinion, that the Baron has been led into an error in surgery, in supposing that the effects of wounds of the tendons, ligaments, &c. are so very simple as to heal without any bad symptoms.—Before concluding this note, however, it is proper to observe, that some of the parts supposed by Baron Haller and others to be wholly insensible, and which really appear to be so in a sound state, have been found to acquire considerable sensibility by disease; an inattention to which circumstance has been the principal cause of that apparent contrariety of facts with which this subject has been perplexed.

(d) The growth of a new nail is a familiar instance of what is here advanced.—At its first formation it is soft, and of exquisite sensibility; but as it approaches to a harder texture, its sensibility gradually decreases, and it becomes at length capable of being cut or pared, without any appearance of pain or feeling.

(e) It is common with the generality of anatomical authors, to ascribe great sensibility to the periosteum. But this opinion is repugnant to the system mentioned in a former note; and it appears to be very probable, that this membrane, if not quite insensible, possesses, however, but a very obscure degree of feeling.

(f) Authors, who allow great sensibility to a part, consequently suppose it to be plentifully supplied with nerves.—But the nerves of the periosteum, if it contains any, have never yet been demonstrated.

d, In all parts of the bones which are exposed to friction, the periosteum is wanting; as at the joints, and in the parts of the teeth which are above the sockets: it is likewise deficient where-ever tendons or muscles are attached to bones; the tendons in these places performing the office of the periosteum.

e, Cartilages are covered with a membrane, called *perichondrium*, which, in its use and structure, resembles the periosteum.

⁵ Of the marrow.
f, The marrow is a fat, oily substance, filling the cavities of bones. That which is found in the great cavities of long bones, is of a much firmer consistence, than that which is found in the cells of their spongy part. The first of these only is known by the name of marrow, the latter being usually called the *medullary substance*.

g, The marrow is inclosed by a very fine and transparent membrane; in some places it is of a reddish colour, where it is supplied with a great number of blood-vessels, which it receives from those of the periosteum. Anatomists file this membrane, *membrana medullaris, or perigleum internum*; from its lining the cavities of bones. It furnishes an infinite number of vesicular processes (a) which inclose the marrow. The medullary substance is likewise surrounded by a very delicate membrane; so that neither the marrow, nor the medullary substance, are in immediate contact with the bones.

c, There are, in the periosteum internum, vessels destined for the secretion of the marrow; and likewise absorbents which take up the oil and return it again to the circulation.

d, It is probable that the marrow is renewed by a kind of circulation. When the absorbents take up more of it than the secretory vessels are able to separate, it gradually decreases. It is for this reason, that so little is found in the bones of people who die of lingering diseases.

e, The marrow was formerly supposed to be intended for the nourishment and renewal of the bones; but its oily consistence seems sufficiently to contradict this opinion. Its principal use is, probably that of preserving the bones moist (u), the natural heat of the body keeping it constantly sufficiently liquid to be insinuated between the bony fibres, which it may soften and render less brittle.

f, The ancients were of opinion, that the bones were more filled with marrow at the new than at the full moon. The claws of craw-fish too, which are not filled with marrow, but with actual muscles, were likewise considered as being more or less filled according to the state of the moon: but a thousand observations have convinced us of the absurdity of this and many other opinions; and we are in these days thoroughly persuaded, that the moon has no more power over the marrow

of the bones, or the claws of craw-fish; than it has over an infinite number of other things which it was supposed to influence, before a taste for true philosophy took place amongst us.

a, The synovial glands are small spherical bodies (1), and exceedingly vascular, supposed to secrete a fluid of a white mucilaginous nature, which serves to lubricate the joints. They are placed in small cavities in the articulations, so as to be capable of being gently compressed by the motion of the joint, which expresses their juice in proportion to the degree of friction. When the synovia is wanting, or is of too thick a consistence, the joint becomes stiff and incapable of flexion or extension. This is what is termed *anchylosis*. The synovia, become acrid and inspissated, is usually considered as the cause of the gout; which the Greeks have called *arthritus*, a word signifying a disease of the joints.

a, Ligaments are white, glistening, inelastic bands, of a compact substance, more or less broad or thick; and serving to connect the bones together. They are distinguished by different names, adapted to their different forms and uses. Those of the joints are called either *round* or *burfal*. The round ligaments are white, tendinous, and inelastic. They are strong and flexible, and are chiefly found in those articulations which are capable of flexion and extension; as in the joints of the elbow and knee. The burfal or capsular ligaments, surround the whole joint like a purse, and are to be found in the articulations which allow motion every way; as in the articulation of the arm with the scapula.

a, The word skeleton, which by its etymology implies simply a dry preparation, is usually understood to signify an assemblage of all the bones of an animal united together in their natural order. It is said to be a natural skeleton, when the bones are connected together by their own proper ligaments; and an artificial one, when they are joined by means of wire.

b, The skeleton is generally divided into the head, trunk and extremities. The first division includes the bones of the cranium and face. The bones of the trunk, are the spine, ribs, sternum, and bones of the pelvis.

c, The upper extremities on each side, contain the two bones of the shoulder, *viz.* the scapula, and clavicle; the bone of the arm or os humeri; the bones of the fore arm; and those of the hand.

d, The lower extremities, on each side of the trunk; consist of the thigh-bone, and the bones of the leg and foot.

CHAPTER II.

Of the BONES of the Head (κ).

a, THE head is of a roundish figure, and somewhat oval (u.)

(c) The marrow is likewise supported in these cavities by the bony filaments of the reticular substance of the bones.
(u) Havers, who has written professedly on the bones, describes the canals by which the marrow is conveyed thro' every part of their substance; and divides them into longitudinal and transverse ones.---He speaks of the first as extending through the whole length of the bone; and of the latter, as the passages by which the longitudinal ones communicate with each other. The transudation of the oil through the bones of the skeleton, seems to prove that some such passages do actually exist; but it is very difficult, if not impossible, to demonstrate them satisfactorily.

(1) It is now much doubted, however, whether the appearances in the joints, which are generally called *glands*, are any thing more than assemblages of fat.

(κ) The description of the bones will be, to many readers perhaps, dry, tedious, and difficult to be understood.---It is a subject which seems to preclude all attempts at variety or elegance of style.---All the bones have one great use, that of inclosing and supporting the other parts of the body: and the reader may defer the reading this part of the

work

oval (1.). Its greatest diameter is from the forehead to the occiput; its upper part is called *siniput*, or the crown of the head; its anterior or fore part, is called the *face*; and the upper part of this is called the *forehead*; its posterior or hind part, is called the *occiput*; its sides are called the *temples*; and its inferior part, the *base*.

b. The bones of the head may be divided into those of the cranium, and face.

SECT. i. Of the BONES of the Cranium.

a. THERE are eight bones of the cranium, *viz.* the coronal bone or os frontis; the two parietal bones or ossa bregmatica; the os occipitis; the two temporal bones; the sphenoid bone; and the os ethmoides or cribriforme.

b. The six first are considered as proper to the cranium, and the two latter as common both to the cranium and face.

c. These bones are all harder at their surface than in their middle; and on this account they are divided into two tables, and a middle spongy substance called *diploe*.

a. In this, as in all the other bones, we shall consider its figure, structure, processes, depressions, and cavities; and the manner in which it is articulated with the other bones.

b. The os frontis has some resemblance in shape to the shell of the cockle. Externally it is convex, its concave side being turned towards the brain. This bone, in the places where it is united to the temporal bones, is very thin; and has there no *diploe*. It is likewise exceedingly thin in that part of the orbit of the eye which is nearest to the nose. Hence it is that a wound in the eye, by a sword, or any other pointed instrument, is sometimes productive of immediate death. In these cases, the sword passing through the weak part of the bone, penetrates the brain, and divides the nerves at their origin; or perhaps, opens some blood-vessel, the consequences of which are soon fatal.

c. We observe, on the exterior surface of this bone, five apophyses or processes; which are easily to be distinguished. One of these is placed at the bottom and narrowest part of the bone, and is called the *nasal process*, from its supporting the upper end of the bones of the nose. The four others are called *orbital processes*. They serve to form the orbits, which are the cavities in which the eyes are placed. In each of these orbits there are two processes, one at the interior or great angle, and the other at the exterior, or little angle of the orbit. They are called the *angular processes*. Between these a ridge is extended in form of an arch, and on this the eyebrows are placed. It is called the *orbital* or *superciliary ridge*; and in some measure covers and defends the globe of the eye. This arch is interrupted near the nose by a small pit, in which the tendon of the musculus obliquus major of the eye is fix-

ed. In each orbit, under the external process, a considerable depression is observed, in which the lachrymal gland is lodged.

d. In the anterior part of the os frontis, there is a considerable discontinuation of it, which is filled up by the cribriform part of the os ethmoides.

e. The internal view of this bone affords us an elevation in form of a ridge, which has been called the *spinous process*: it passes from the anterior to the posterior part of the bone, dividing it into two considerable fossæ, in which the anterior lobes of the brain are placed. To this ridge is attached the extremity of the *falsæ*, as the membrane is called which divides the brain into two hemispheres. Besides these two fossæ, there are many depressions which appear like digital impressions, and owe their formation to the prominent circuminvolutions of the brain.

f. In young subjects the forehead is formed of two distinct bones; so that in them the sagittal suture extends from the os occipitis to the nose. This bone is almost every where composed of two tables and a *diploe*. These two tables separating from each other under the eyes, form two cavities, one on each side of the face, called the *frontal sinuses*. These sinuses are lined with a soft membrane, called *membrana pituitaria*. In these sinuses a mucus is secreted, which is constantly passing, through two small holes, into the nostrils which it serves to moisten.

g. The os frontis is joined by future to many of the bones of the head, *viz.* to the parietal, maxillary, and temporal bones; to the os ethmoides; os sphenoides; os unguis; and ossa nasi. The future which connects it with the parietal bones, is called the *coronal suture*.

a. The parietal bones are two in number; they are very thin, and even transparent in some places. The particular figure of each of these bones, is that of an irregular square, bordered with indentations thro' its whole circumference, except at its lower part. It will be easily conceived that these bones, which compose the superior and lateral parts of the cranium, and cover the greatest part of the brain, form a kind of vault. On their inner surface we observe the marks of the vessels of the dura mater.

b. The ossa parietalia, are joined to each other by the sagittal suture; to the os sphenoides, and ossa temporum, by the squamous suture; to the os occipitis, by the lambdoidal future (*m*); so called from its resemblance to the Greek letter *lambda*; and to the os frontis, by the coronal future.

c. In new-born infants, the ossa parietalia are separated from the middle of the divided os frontis, by a portion of the cranium then unossified. When the finger is applied to this part, which is called the *fontanelle*, the dilatation of the brain, and of the vessels of the dura mater, may be easily felt. And in midwifery, the feel of this part, which, in natural labours,

work till he meets with a skeleton.---That part, however, which relates to the teeth is excepted, as being a branch which ought to be understood by every body, independent of the skeleton.

(1.) The bones of the fœtus being perfectly distinct, and the muscles in young persons not acting much, the shape of the head is supposed to depend much on the management of children, when very young. Vesalius, who has remarked the difference in people of different nations, observes for instance, that the head of a Turk is conical, from the early use of the turban; whilst that of an Englishman is flattened by the chin-stay.

(m) The lambdoidal future is sometimes very irregular; being composed of many small sutures, which surround so many little bones called *ossa triquetra*, tho' sometimes improperly, as they are not always triangular.

is the first to present itself, is an indication of the state of the fœtus, whether it be living or dead. Every blow on this part, in children, is liable to be attended with the most fatal consequences; and it is not without reason, that experienced nurses cautiously defend it from injury, by applying a linen cloth to it several times doubled.

13
the occi-
tal bone.

a, The occipital bone forms the posterior and inferior parts of the skull: it approaches near to the shape of a lozenge, and is indented throughout three parts of its circumference.

b, There is a considerable hole in the inferior portion of this bone, called the *foramen magnum*; thro' which the medulla oblongata passes into the spine. The *nervi accessorii*, and vertebral arteries, likewise pass thro' it. Besides this, there are usually four other holes peculiar to this bone, and two which are common to it and the ossa temporum; these foramina serve for the passage of the blood-vessels and nerves. At the sides, and a little on the anterior part of the foramen magnum, are two processes called the *condyles*, one on each side; they are of an oval figure, and are covered with cartilage.

c, The external surface of this bone, which is very irregular, affords attachment to several muscles. On looking over its internal surface, we perceive the appearance of a cross, formed by a very prominent ridge; which rises upwards from near the foramen magnum, and by two transverse sinuities, one on each side of the ridge. This cross occasions the formation of four fossæ, two above and two below the sinuities. In the latter are placed the lobes of the cerebellum; and in the former, the posterior lobes of the brain. The two sinuities serve to receive the lateral sinuses.

d, In the upper part of this bone is seen a continuation of the sinuosity of the longitudinal sinus. The cuneiform process (which is the name given to the great apophysis at the fore part of this bone) is made concave for the reception of the medulla oblongata.

e, The occipital bone is thicker and stronger than either of the other bones of the head, tho' irregularly so; at its inferior part where it is thinnest, it is covered by a great number of muscles.

f, The reasons for so much thickness and strength in this bone seem to be, that it covers the cerebellum, in which the least wound is of the utmost consequence; and, that it is by its situation more liable to be fractured by falls than any other bone of the cranium. For if we fall forwards, the hands are naturally put out to prevent the forehead's touching the ground; and if to one side, the shoulders in a great measure protect the sides of the head; but if a person falls backwards, the hind part of the head consequently strikes against the earth, and that too with considerable violence. Nature then has wisely constructed this bone so as to be capable of the greatest resistance.

g, The os occipitis, is joined by means of the cuneiform process to the sphenoid bone, with which it often ossifies and makes but one bone in those who are advanced in life. It is connected to the parietal bones by the lambdoidal future; and to the temporal bones, by the additamenta of the same future. This head is likewise united to the trunk by means of this bone. The two condyles of the occipital bone, are received into the superior oblique processes of the first vertebra of the

neck; and it is by means of this articulation that a certain degree of flexion and extension, or rather of motion of the head forwards and backwards, is performed. We say a certain degree of motion, because that which is performed on the first vertebra alone, and independent of the other vertebra, is very inconsiderable.

h, In flexion, the vertebra form a kind of bow, and straighten themselves again in extension.

a. There are two temporal bones, one on each side. ¹⁴ Of the temporal bones They are usually divided into two parts, one of which is called the *squamous*, or *scaly part*; and the other *os petrosum*, from its inequality and hardness. This last is shaped like a pyramid.

b, In both these parts there are processes and cavities to be described; externally there are three processes, one anterior, called the *zygomatic process*; one posterior, called the *mastoid* or *mamillary process*, from its resemblance to a nipple; and one inferior, called the *styloid process*, because it is shaped like a filetto, or dagger.

c, The cavities are, 1. The meatus auditorius externus. 2. A large fossa which serves for the articulation of the lower jaw; it is before the meatus auditorius, and immediately under the zygomatic process. 3. The stylo-mastoid hole, so called from its situation between the styloid and mastoid processes; it is likewise styled the *aqueduct of Fallopius*, and affords a passage to the portio dura of the auditory, or seventh pair of nerves. 4. Below, and on the fore part of the last foramen, we observe part of the jugular fossa; a thimble-like cavity, in which the beginning of the internal jugular vein is lodged. Anterior and superior to this fossa, is the orifice of a foramen through which the carotid artery passes. This conduit runs first upwards and then forwards, forming a kind of elbow, and terminates at the end of the os petrosum: at this part of each of the ossa temporum we observe the opening of the Eustachian tube, a canal which passes from the ear to the mouth.

d, In examining the internal surface of these bones, we remark the triangular figure of their petrous part which separates two fossæ; one superior and anterior, the other inferior and posterior; the latter of these composes part of the fossa, in which the cerebellum is placed; and the former, a portion of the least fossa for the basis of the brain; on the posterior side of the os petrosum, we observe the meatus auditorius internus, into which enters the double nerve of the seventh pair, viz. the portio dura, and portio mollis of that pair.

e, The os petrosum contains several little bones called the *bones of the ear*; which, as they do not enter into the formation of the cranium, shall be described when we are treating of the organs of hearing.

f, The ossa temporum are joined to the ossa malarum by the zygomatic futures; to the parietal bones by the squamous future; to the os occipitis by the lambdoidal future; and, to the sphenoid bone by the future of that name.

a, The os sphenoides, or cuneiforme as it is sometimes called from its wedge-like situation amidst the other bones of the head, is of a more irregular figure than any other bone. It has been compared to a bat with its wings extended. This resemblance is but faint, but it would be difficult perhaps to find any thing it resembles more.

15
Of the os
sphenoides,

b, We distinguish in this bone its body or middle part, and its wings or sides, which are much more extensive than its body.

c, On whatever side we view it, we discover only processes and cavities. The processes, both external and internal, are so very numerous, that it will be sufficient for us to describe the principal ones, of which there are three on the outside: one of these is in the middle, and is shaped like a crest, making part of the septum narium; the other two are the pterygoid or alariform processes, one on each side of the body of the bone, and at no great distance from it; each of these processes is divided into two wings; and of these the exterior one is the widest; the other terminates in a hook-like process.

d, This bone on its inner surface affords three fossæ, two of which are considerable ones; they are formed by the wings of the bone, and make part of the lesser fossæ of the basis of the skull. The third, which is smaller, is on the top of the body of the bone, and is called *fossa turcica*; from its resemblance to a Turkish saddle. This fossa, in which the pituitary gland is placed, has posteriorly and anteriorly processes, called the *ethmoid processes*.

e, There are eight holes in this bone, viz. four on each side; several pair of nerves and some blood vessels pass through them.

f, Within the substance of the os sphenoides, there are two sinuses separated by a bony plate. They are lined with the pituitary membrane; and like the frontal sinuses, secrete a mucus which passes into the nostrils.

g, The os sphenoides is joined to all the bones of the cranium, and likewise to the ossa maxillaria, ossa malarum, ossa palati, and vomer.

h, This bone makes part of the basis of the skull, serves to form in some measure the orbits, and affords attachment to several muscles.

a, The os ethmoides, or sieve-like bone, as it is called from the great number of small holes with which it is pierced, is placed in the anterior part of the basis of the skull, and is the last bone that enters into the composition of the cranium. It is nearly of a cubical figure.

b, There are three parts to be described in this bone, viz. one in the middle, and two at its sides; the middle part, from which it derives its name, is a thin lamella, or bony table, pierced with an infinite number of holes, through which pass as many filaments of the olfactory nerve. From the middle of this plate, both on the outside and from within, there rises up a process which is easily observed. The inner one is called *crista galli*, from its supposed resemblance to a cock's comb; to this process the falx is attached, which divides the brain into two hemispheres. The exterior process, which has the same common basis as the *crista galli*, is a fine lamella, which is united to the vomer, and divides the cavity of the nostrils, tho' unequally; it being usually inclined to one side or other.

c, The lateral parts of this bone are composed of a cellular substance, and these cells are so very intricate, that their figure or number cannot be described. Many writers have on this account, called this part of the bone the *labyrinth*. These cells are externally covered with bony lamina, thin like the cells themselves, but very

smooth and plain. This part of the bone is called *os planum*; and forms part of the orbit.

d, The different cells of this bone, which are so exceedingly numerous, and which are every where lined with the pituitary membrane, evidently serve to enlarge the cavity of the nose in which the organ of smelling resides.

e, This bone is joined to the os sphenoides, os frontis, ossa maxillaria, ossa palati, ossa nasi, ossa unguis, and vomer.

f, The ancients, who considered the brain as the seat of all the humours, were of opinion, that this viscous discharged its redundant moisture through the holes of the ethmoid bone. But in these times they only can adopt so erroneous a notion, who have not exact ideas of the human anatomy. The vulgar still think that abscesses of the brain discharge themselves through the mouth and ears, and that snuff is liable to get into the head; but neither snuff, nor the matter of an abscess, are more capable of passing thro' the cribiform bone, than the serosity which they supposed was discharged thro' it in a common cold; all the holes of the ethmoid bone are filled up with branches of the olfactory nerve. Its inner part is likewise covered with the dura mater, and its cells are every where lined with the pituitary membrane; so that neither matter, nor any other fluid can possibly pass through this bone either externally, or internally. Matter is, indeed, sometimes discharged through the nostrils; but the seat of the disease is in the sinuses of the nose, and not in the brain; and imposthumations are observed to take place in the ear, which suppurate and discharge themselves externally.

g, Before we leave the bones of the head, we wish to make some general observations on its structure and figure. As the cranium might have been composed of a single bone, the articulation of its several bones being absolutely without motion, it may be asked, perhaps, why such a multiplicity of bones, and so great a number of sutures? Many advantages may possibly arise from this plurality of bones and sutures, which have not yet been observed. We are able, however, to point out many useful ends which could only be accomplished by this peculiarity of structure: in this, as in all the other works of nature, the great wisdom of the Creator is evinced, and cannot fail to excite our admiration and gratitude.

h, The cranium, by being divided into several bones, grows much faster and with greater facility than if it was composed of one piece only. In the fetus, the bones as we have before observed, are perfectly distinct from each other. The ossification begins in the middle of each bone, and proceeds gradually to the circumference. Hence the ossification, and of course the increase of the head, is carried on from an infinite number of points at the same time; and the bones consequently approach each other in the same proportion. To illustrate this doctrine more clearly, if it can want further illustration; suppose it necessary for the parietal bones, which compose the upper part of the head, to extend their ossification, and form the fore part of the head likewise; is it not evident, that this process would be much more tedious than it is now, when the os frontis and the parietal bones are both growing at the same time? Hence it happens that the heads of young people, in which the bones begin to touch each other, increase,

crease slowly; and that the proportionate increase of the volume of the head is greater in three months in the fœtus, than it is perhaps in 24 months, at the age of 14 or 15 years.

i, The futures, exclusive of their advantages in suspending the processes of the dura mater, are evidently of great utility to prevent the too great extent of fractures of the skull. Suppose, for instance, that by a fall or blow, one of the bones of the cranium becomes fractured. The fissure which, in a head composed of only one bone would be liable to extend itself through the whole of it, is stopped by the first future it meets, and the effects of the injury are confined to the bone on which the blow was received.

k, The spherical shape of the head seems likewise to render it more capable of resisting external violence than any other shape would do. In a vault the parts mutually support and strengthen each other; and this happens in the cranium.

SECT. II. OF THE BONES OF THE FACE.

¹⁷ the bones of the face. a, The face, which consists of a great number of bones, is usually divided into the upper and lower jaws: of these the latter is capable of motion, but the former is immoveable. The bones of the upper jaw are thirteen in number, exclusive of the teeth, which we shall describe separately, after having finished the other bones of the head. Of these thirteen bones, there are six on each side of the maxilla superior, or upper jaw; and one in the middle.

b, The bones, which are in pairs, are the ossa maxilarum; ossa maxillaria; ossa nasi; ossa unguis; ossa palati; and ossa spongiosa inferiora. The single bone is the vomer.

¹⁸ of the ossa maxilarum. a, The ossa maxilarum are the prominent square bones which form the upper part of the cheeks; they are situated close under the eyes, and make part of the orbits. Each of these bones have three surfaces to be considered. One of these is exterior and somewhat convex; the second is superior and concave, serving to form the lower and lateral parts of the orbit. The third, which is posterior, is very unequal, and concave for the lodgment of the lower part of the temporal muscle.

b, Each of these bones may be described as having four processes formed by their four angles. Two of these may be called orbital processes. The superior one is united by future to the os frontis, and that below, to the maxillary bone. The third is connected with the os sphenoides by means of the transverse future; and the fourth is joined to the zygomatic process of the temporal bone, with which it forms the zygoma.

¹⁹ of the ossa maxillaria superiora. a, These bones are so called, because they constitute the most considerable portion of the upper jaw. They are two in number, and generally remain distinct thro' life. Their figure is exceedingly irregular, and not easily to be described.

b, Of the many processes which are to be seen on these bones, and which are connected with the bones of the face and skull, we shall describe only the most remarkable.

c, One of these processes is at the upper and fore-part of the bone, making part of the side of the nose, and called the *nasal process*. Another forms a kind of circular sweep at the inferior part of the bone, in which are the alveoli, or sockets for the teeth; this is called

the alveolar process. A third process is united to the os maxilæ on each side. The *alveolar process* has, posteriorly, a considerable tuberosity on its internal surface, called the *maxillary tuberosity*.

d, There are two horizontal lamellæ behind the alveolar process, which uniting together, form part of the roof of the mouth, and divide it from the nose. This partition, being feated somewhat higher than the lower edge of the alveolar process, gives the roof of the mouth a considerable hollowness.

e, In viewing these bones internally, we observe a fossa in the inferior portion of the nasal process; which with the os unguis, forms a passage for the lacrymal duct.

f, Where these two bones are united to each other, they project somewhat forwards, leaving between them a furrow which receives the inferior portion of the septum nasi.

g, Each of these bones is hollow, and forms a considerable sinus under its orbital part. This sinus, which is usually called *antrum highmoreanum* is lined with the pituitary membrane, it answers the same purposes as the other sinuses of the nose; and communicates with the nostrils, by an opening which appears to be a large one in the skeleton, but in the recent subject is much smaller.

h, The ossa maxillaria, not only serve to form the cheeks, but likewise the palate, nose, and orbits; and besides their union with each other, they are connected with the greatest part of the bones of the face and cranium, viz. with the ossa nasi, ossa maxilarum, ossa unguis, ossa palati, os frontis, os sphenoides, and os ethmoides.

a, The ossa nasi resemble two irregular squares. They ²⁰ Of the ossa are narrower and thicker above than below; externally they are somewhat convex, and internally a little concave. These bones constitute the upper part of the nose; at their fore part they are united to each other; above to the os frontis; by their sides to the ossa maxillaria superiora; posteriorly and interiorly, to the septum narium; and below to the cartilages which compose the rest of the nostrils.

a, These bones derive their name from their transparency, and figure which resembles that of a fingernail; they are likewise styled *ossa lacrymalia*, because they help to form, with the nasal process of the os maxillare superius on each side, an excavation for the lodgment of the lacrymal sac; and to compose part of the lacrymal duct through which the tears pass into the nostrils.

b, These bones, which are the smallest bones of the face, are of an irregular shape; and may be described as having two smooth parts, divided by a middle ridge on their external surface. One of these parts which is flat, forms a small part of the orbit; the other, which is next to the nose, is concave, and makes, as we have before observed, part of the lacrymal duct; by its union with the canal formed by the nasal process of the superior maxillary bone. That part of the bone which forms the duct is cribriform, being pierced with a great number of holes.

c, Each of these bones is joined to the os maxillare superius, os frontis, and os ethmoides.

a, These bones are of a very irregular figure; they ²¹ Of the ossa are placed at the back part of the roof of the mouth, ^{palati.} and

and serve to form the nasal and maxillary fossa, and a small portion of the orbit. Where they are united to each other they rise up into a spine on their internal surface; this spine appears to be a continuation of that of the superior maxillary bones, and helps to form the septum narium.

b, These bones are joined to the ossa maxillaria superiora, os sphenoides, os ethmoides, and vomer.

23
Of the vomer.

a, This bone derives its name from its resemblance to a plough-share. It is a long and flat bone, somewhat thicker at its back than at its fore part. At its upper part we observe a furrow extending through its whole length. The back of this furrow which is the largest, receives a process of the sphenoid bone; from this the furrow advances forwards, and becoming narrower and shallower, receives some part of the nasal lamella ethmoides; the rest serves to support the middle cartilage of the nose.

b, The inferior portion of this bone is placed on the nasal spine of the maxillary and palate bones, which we mentioned in our description of the ossa palati.

c, The vomer is united to the os sphenoides, os ethmoides, ossa maxillaria superiora, and ossa palati. It forms part of the septum narium, by dividing the back part of the nose into two nostrils.

24
Of the ossa sphenoida inferiora.

a, The parts which are usually described by this name, do not seem to deserve to be distinguished as distinct bones. They consist of a spongy lamella in each nostril, which is united to the spongy lamina of the ethmoid bone, of which they are by some considered as a part.

b, Each of these lamellæ is longest from behind, forwards; with its convex surface turned towards the septum narium, and its concave part towards the maxillary bone, covering the opening of the lachrymal duct into the nose.

c, These bones are covered with the pituitary membrane; and, besides their connection with the ethmoid bone, are joined to the ossa maxillaria superiora; ossa palati; and ossa unguis.

25
Of the maxilla inferior.

a, The maxilla inferior, or lower jaw; which in its figure resembles a bow with its end elevated; is at first composed of two distinct bones; but these soon after birth unite into one at the middle of the chin, so as to form only one bone. The superior edge of this bone has, like the maxilla superior, a process called the alveolar process. This as well as that of the upper jaw to which it is in other respects a good deal similar, is likewise furnished with cavities for the reception of the teeth.

b, The posterior part of the bone on each side rises almost perpendicularly into two processes, one of which is called the *coronoid*, and the other the *candyloid process*. The first of these is the highest; it is thin and pointed, and the temporal muscle which is attached to it, serves to elevate the jaw. The candyloid process is narrower, thicker, and shorter than the other; terminating in an oblong rounded head, which is made for a moveable articulation with the cranium, and is received into a fossa of the temporal bone. In this joint there is a moveable cartilage, which being more closely connected to the condyle than to the cavity, may be considered as belonging to the former. At the bottom of each coronoid process, on its inner part, is a foramen or canal, which extends under the roots of all the

teeth, and terminates at the outer surface of the bone near the chin. Each of these foramina affords a passage to an artery, vein, and nerve, which send off branches to the several teeth.

c, This bone is capable of a great many motions. The condyles, by sliding from the cavity towards the eminences on each side, bring the jaw horizontally forwards, as in the action of biting; or the condyles only may be brought forwards while the rest of the jaw is tilted backwards, as in the case when the mouth is open. The condyles may also slide alternately backwards and forwards, from the cavity to the eminence, and vice versa; so that, while one condyle advances, the other moves backwards, turning the body of the jaw from side to side, as in grinding the teeth. The great use of the cartilages seems, to be that of securing the articulation, by adapting themselves to the different inequalities in these several motions of the jaw, and to prevent any injuries from friction. This last circumstance is of great importance where there is so much motion; and Mr J. Hunter has accordingly found this cartilage in the different tribes of carnivorous animals where there is no eminence nor cavity, nor other apparatus for grinding.

d, The alveolar processes are formed of an external and internal plate united together by thin bony partitions, which divide the processes at the fore part of the jaw into as many sockets as there are teeth; but at the posterior part where the teeth have more than one root, each root has a distinct cell. These processes in both jaws begin to be formed with the teeth, accompany them in their growth, and disappear when the teeth fall; so that the loss of the one seems constantly to be attended with the loss of the other.

a, The teeth are bones of a particular structure, formed for the purposes of mastication, and the articulation of the voice.

b, Each tooth may be divided into its body, neck, and root, or fangs. The body of the tooth is that part which appears above the gums. The root is fixed into the socket, and the neck is the middle part between the two. The teeth are composed of two substances, *viz*, enamel, and bone. The enamel, or as it is sometimes called, the vitreous, or cortical part of the tooth, is a very hard and compact substance, of a white colour, and peculiar to the teeth. When broken, it appears fibrous or striated; and all the fibres are directed from the circumference to the center of the tooth. This enamel is thickest on the grinding surface, becoming gradually thinner as it approaches the neck, where it terminates insensibly. Ruysch affirmed, that he could trace the arteries into the hardest part of the teeth; Lewenhoeck suspected the fibres of the enamel to be so many vessels; and, Monro says, he has frequently injected the vessels of the teeth in children so as to make the inside of the cortex appear perfectly red. But Mr J. Hunter who has written professedly on the teeth, says, that no injection will ever reach this substance; that it receives no tinge from madder; and that it has no marks of being vascular, or of having a circulation of fluids.

c, The bony part of a tooth resembles other bones in its structure, but is much harder than the most compact part of bones in general. It composes the inner part of the body, neck and root of the tooth. From

certain

certain circumstances (N) this part of a tooth appears to be vascular, but there are many others which tend to prove that it is not.

d, Each tooth has an inner cavity, which beginning by a small opening, becomes larger and terminates in the body of the tooth.

e, This cavity is supplied with an artery, vein, and nerve, which pass through the small hole in the root. In old people this hole sometimes closes, and the tooth becomes then inflexible.

f, The teeth are invested with a periosteum from their fangs to a little beyond their bony sockets, where it is attached to the gums. This membrane seems to be common to the tooth which it incloses, and to the sockets which it lines.

g, The teeth are likewise secured in their sockets by a red substance called the *gums*, which every where covers the alveolar processes, and has as many perforations as there are teeth. The gums are exceedingly vascular, and have something like a cartilaginous hardness and elasticity, but do not seem to have much sensibility. The gums of infants, which perform the offices of teeth, have a hard ridge extending through their whole length, but in old people who have lost their teeth this ridge is wanting.

h, The number of the teeth in both jaws at full maturity, usually varies from 28 to 32. They are commonly divided into three classes, *viz.* incisors, canini, and grinders, or molares (o). The incisors are the four teeth in the fore part of the jaws; they derive their name from their use in dividing and cutting the food, and have each of them two surfaces which meet in a sharp edge. Of these surfaces, the anterior one is convex, and the posterior one somewhat concave. In the upper jaw they are usually broader and thicker,

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(N) These circumstances are, that the teeth like other bones are liable to swellings; and that they are found ankylosed with the socket. But Mr J. Hunter supposes that both these may be original formations. He never saw the vessels of the teeth injected in any preparation, either of young or old subjects; and as the most convincing proof of their not being vascular, he reasons from the analogy between them and other bones. He observes, for instance, that in a young animal that has been fed with madder, the parts of the teeth which were formed before it was put on the madder diet will appear of their natural colour, but that such parts as were formed while the animal was taking the madder will be of a red colour, whereas in other bones, the hardest parts are susceptible of the dye, tho' more slowly than the parts which are growing. Hence, he supposes, that the teeth when completely formed cease to be vascular. Again, he tells us, that if you leave off feeding the animal with madder a considerable time before you kill it, you will find the above appearances still subsisting, with this addition, that all the parts of the teeth which were formed after leaving off the madder will be white. This experiment proves, that a tooth once tinged does not lose its colour, whereas other bones do (tho' very slowly) return again to their natural appearance: and as the dye in this case must be taken into the habit by the absorbents, he is led to suspect that the teeth are without absorbents as well as other vessels. Tho' from these and other reasons, they seem to appear as extraneous bodies with respect to a circulation thro' their substance, yet they most certainly possess a living principle. They are not easily affected by the diseases to which other bones are liable. They do not become soft in a mollities ossium, nor is their growth evidently retarded in rickety children: but they are, as we often experience, exquisitely sensible; and are capable of being transplanted into other sockets when recently drawn. This sensibility evidently arises from the exposure of the nerve in a cavity of the tooth; and their disposition to unite with the sockets into which they are transplanted, tho' a proof of their living principle (for a tooth that has been long drawn before it is transplanted, and which of course has lost this principle will never become fixed) does not absolutely prove their having a circulation.

(o) Mr Hunter has thought proper to vary this division. He retains the old name of *incisors* to the four fore teeth, but he distinguishes the canine teeth by the name of the *cuspidati*. The two teeth which are next to these, and which have been usually ranked with the molares, he calls the *bicuspidati*; and he gives the name of *grinders* only, to the three last teeth on each side.

(p) The canine teeth of the upper jaw are likewise sometimes called *eye teeth*, from their supposed connection with the eyes, and the great danger to which the eye-sight is thought to be exposed by their being drawn. Although these are vulgar notions, real evils are sometimes occasioned by extracting them. They are separated from the maxillary sinus, only by a very thin bony partition: this partition is liable to be injured in the operation, and the pituitary membrane being in this case torn, inflammation and the most disagreeable consequences have often ensued.

(q) Mr Hunter remarks of these teeth, that we may trace in them a similarity in shape, situation and use, from the most imperfectly carnivorous animal, which we believe to be the human species, to the lion, which is the most perfectly carnivorous.

especially the two first, than those of the under jaw, over which they generally fall by being placed a little obliquely.

i, The canini are the longest of all the teeth, deriving their name from their resemblance to a dog's tusks (r.) There is one of these teeth on each side of the incisors, so that there are two in each jaw. Their fang differs from that of the incisors, only in being much larger; and their shape may be easily described to be that of an incisor with its edge worn off so as to end in a narrow point instead of a thin edge.

k, These teeth not being calculated for dividing like the incisors, or for grinding, seem to be intended for laying hold of substances (Q).

l, The grinders, or molares, of which there are ten in each jaw, are so called, because from their size and figure they are calculated for grinding the food. The canini and incisors have only one fang, but the three last grinders in the under jaw have constantly two fangs; and the same teeth in the upper jaw three fangs. Sometimes these fangs are divided into two points near their base, and each of these points has, perhaps, been sometimes considered as a distinct fang. The grinders likewise differ from each other in their appearance. The two first on each side, which Mr Hunter appears to have distinguished very properly by the name of *bicuspidati*, seem to be of a middle nature, between the incisors and grinders; and have sometimes only one root. The two beyond these on each side are much larger. The last grinder is shorter and smaller than the rest, and from its coming through the gums later than the rest, and sometimes not appearing till late in life, is called *dens sapientie*. The variation in the number of teeth usually depends on the dentes sapientie.

m, There is in the structure and arrangement of all these

X x

these teeth an art which cannot be sufficiently admired. To understand it properly, it will be necessary to consider the under jaw as a kind of lever, with its fixed points at its articulations with the temporal bones: it will be right to observe too, that its powers arise from its different muscles, but in elevation chiefly from the temporals; and that the aliment constitutes the object of resistance. It will appear then that the molares, by being placed nearest the centre of motion, are calculated to press with a much greater force than the other teeth, independent of their grinding powers, and that it is for this reason we put between them any hard body we wish to break.

n, The canini and incisores, are placed farther from this point, and of course cannot exert so much force; but they are made for cutting and tearing the food; and this form seems to make amends for their deficiency in strength.

o, There are examples of children who have come into the world with two, three, and even four teeth; but these examples are very rare, and it is seldom before the seventh, eighth or ninth month after birth that the incisores begin to pass through the gum. The symptoms of dentition, however, in consequence of irritation from the teeth, frequently take place in the fourth or fifth month. One of the incisores usually appears first in the lower jaw, and is followed by one in the upper jaw; and so on alternately, till these eight teeth are cut after this: the child continues easy during one, two, or three months, when the symptoms of irritation take place again; and continue till about the eleventh or twelfth month, when one and sometimes two of the canini begin to appear at a time, but most usually in succession. Here then are twelve teeth in the first year.

p, About the seventeenth, eighteenth, or twentieth month, and sometimes later, two of the molares appear in each jaw, and enable children to take solid nourishment.

q, We all know the danger to which children are exposed during the time of dentition; and we shall not be surprized at it, if we consider that every tooth before it makes its appearance must pass through a bony lamella which covers the socket; and likewise thro' the perioosteum and gums.

r, The symptoms are more or less alarming, in proportion to the resistance which these parts afford to the teeth; and, according to the number of teeth which may chance to seek a passage at the same time. Were they all to appear at once, children would fall victims to the pain and excessive irritation; but nature has so very wisely disposed them, that they usually appear one after the other, with some distance of time between each.

s, About the age of two years, four other dentes molares usually appear; four others in the fourth or fifth year, and four more about the seventh year. These make up the twenty-eight teeth, which continue to be the number till the twentieth, twenty-second, or twenty-fifth year; and sometimes later, when four more grinders make their appearance, and these are the dentes sapientie. These teeth have been in some instances

cut at the age of eighty years; and it sometimes happens that they do not appear at all. This then is the number of teeth, and the order in which they appear; but it is to be observed, that about the seventh, eighth, ninth or tenth year; sometimes a little sooner, sometimes later, the incisores begin to fall out of their sockets; and that, between the seventh and fourteenth year, not only the incisores, but likewise the canini, and sometimes the four first molares, making in all twenty teeth, are shed, and their place supplied by others of a firmer texture, with larger fangs, which remain till they become affected by disease, or fall out in old age. The first teeth are called the *temporary* or *milk teeth*, to distinguish them from the adult teeth. The rudiments of both these series of teeth are originally formed together in the fœtus, and are to be seen in the jaws of very young subjects in two rows, and in a distinct set of alveoli; so that it is not by the growing of one tooth under another in the same socket, that the uppermost tooth is mechanically pushed out, as is perhaps commonly imagined; but the temporary teeth, and those which are to succeed them, being as we have just now observed, placed in separate alveoli; the upper sockets gradually disappear, as the under ones increase in size, till at length the teeth they contain having no longer any support, consequently fall out.

SECT. iii. Of the Os HYOIDES. (R).

a, The os hyoides which is placed at the root of the tongue, was so called by the ancients on account of its supposed resemblance to the Greek letter u.

b, It will be necessary to distinguish in it, its body, horns, and appendices.

c, The body is the middle and broadest part of the bone, so placed that it may be easily felt with the finger in the fore part of the throat. Its fore part is irregularly convex, and its inner surface unequally concave. The cornua or horns, which are flat and a little bent, are considerably longer than the body of the bone, and may be said to form the sides of the u. The appendices, or little horns, as they are called by M. Winslow and some other writers, are two processes which rise up from the articulations of the cornua with the body, and are usually connected with the styloid process on each side by means of a ligament.

d, This bone serves to support the tongue, and affords attachment to a variety of muscles, some of which perform the motions of the tongue, and others act on the larynx and fauces.

CHAP. III.

Of the BONES of the Trunk.

a, The trunk of the skeleton is composed of the spine, the thorax, and the pelvis.

SECT. i. Of the Spine.

a, The spine is a long bony column, in figure not much unlike the letter S, which extends from the head to the lower part of the trunk, and is the great support of the whole body.

(R) This bone is very seldom preserved with the skeleton, and cannot be included amongst the bones of the head or in any other division of the skeleton. Thomas Bartholin, has perhaps very properly described it among the parts contained in the mouth; but the generality of anatomical writers have placed it, as it is here, after the bones of the face.

b, It is made of a great number of bones called *vertebræ*.

c, It may be considered as being composed of two irregular pyramids, which are united to each other in that part of the loins where the last of the lumbar vertebrae is united to the os sacrum.

d, The vertebrae which form the upper and longest pyramid, are called *true* vertebrae; and those which compose the lower pyramid, are termed *false* vertebrae; because they do not in every thing resemble the others; and particularly, because in the adult state they become perfectly immovable, whilst the upper ones continue to be capable of motion; for it is upon the bones of the spine that the body turns, and their name has its derivation from the Latin verb *vertere*, which signifies to turn.

e, The vertebrae are likewise divided into five classes, viz. 1. The cervical or vertebrae of the neck; 2. the dorsal or vertebrae of the back; 3. the lumbar or vertebrae of the loins; 4. the os sacrum; and, 5. the coccyx.

f, We will first point out what these bones, and especially the true vertebrae, have in common with each other; and then separately describe these five classes.

g, In each vertebra, as in all other bones, it will be necessary to remark the body of the bone, its processes, and cavities,

h, The body of one of the vertebrae may be compared to part of a cylinder cut off transversely: convex before, and concave at its posterior surface where it makes part of the cavity of the spine.

i, Each vertebra has commonly seven processes.

k, The first of these is, the spinous process, which is placed at the back part of the vertebra, and gives the name of spine to the whole of this bony canal; two others are called transverse processes, from their situation with respect to the figure of the spine; and are placed on each side of the spinous process. The four others which are called *oblique* or *articular* processes are much smaller than the other three; there are two of these on the upper, and two on the lower part of each vertebra, rising from near the basis of the transverse processes. They are called *articular processes*, because they are articulated with each other; that is, the two superior processes of one vertebra, are articulated with the two inferior processes of the vertebra above it; and they are called *oblique processes* from their situation with respect to the processes with which they are united: these oblique processes are articulated to each other by a species of ginglymus, and each process is covered at its articulation with cartilage.

l, There is in every vertebra, between its body and apophyses, a foramen large enough to admit a finger. These foramina correspond with each other through all the vertebrae, and form a long bony conduit for the lodgment of the spinal marrow.

m, Besides this great hole, there are four notches on each side of every vertebra, between the oblique processes and the body of the vertebra; two of these notches are at the upper, and two at the lower part of the bone; each of the inferior notches meeting with one of the superior notches of the vertebra below it, forms a foramen; whilst the superior notches do the same with the inferior notches of the vertebra above it. These four foramina, form passages for blood vessels, and for the

nerves that pass out of the spine: the vertebrae are united together by means of a cartilaginous substance, which forms a kind of partition between the several vertebrae; these cartilages are thicker and more flexible between the lumbar vertebrae than in other parts of the spine; the most considerable motions of the trunk being performed on these vertebrae. These cartilages being very elastic, the extension and flexion of the body, and its motion backwards and forwards, or to either side, are performed with great facility. This elasticity seems to be the reason why people who have been long standing, or have carried a considerable weight, are found to be shorter than when they have been long in bed. In the two first instances, the ligaments are evidently more exposed to compression than when we are in bed in an horizontal posture.

n, The change which takes place in these cartilages in advanced life, occasions the decrease in stature, and the stooping forwards which are usually to be observed in old people. The cartilages then become shrivelled, and consequently lose in a great measure their elasticity.

o, Besides this connection of the several vertebrae by means of these cartilages, there are likewise particular ligaments which unite the several bones to each other; and the periosteum externum, the membrane which incloses the marrow, and the muscles which are attached to the spine, all serve to strengthen this union.

p, We may venture to remark, that all the vertebrae diminish in density and firmness of texture in proportion as they increase in size; so that the lower vertebrae, though larger, are not so heavy as those above them; in consequence of this mode of structure, the size of the vertebrae is increased without adding to their weight; and this is an object of no little importance in a part of the body, which besides flexibility and suppleness, seems to require lightness as one of its essential properties.

q, In very young children, each vertebra is composed of three bony pieces connected by cartilages which afterwards ossify.

a, There are seven vertebrae of the neck; they are of a firmer texture than the other bones of the spine. The transverse processes of these vertebrae are forked for the lodgment of muscles; and, at the bottom of each of these processes, there is a foramen for the passage of the cervical artery and vein. The first and second of these vertebrae must be described more particularly. The first approaches almost to an oval shape; on its superior surface it has two cavities, which admit the condyles of the occipital bone with which it is articulated. This vertebra which is called *Atlas*, from its supporting the head, cannot well be described as having either body or spinous process, being a kind of bony ring. Anteriorly where it is articulated to the odontoid process of the second vertebra, it is very thin.

b, The second vertebra which is called *dentata*, has at its upper and anterior part, a process called the *odontoid process*; from its resemblance to a large tooth, which is articulated with the atlas; to which this second vertebra may be said to serve as an axis.

c, It is commonly observed that the head turns to the right or left upon this vertebra; but this supposition seems to be erroneous.

d, The face cannot turn the quarter of a circle, that is, to the shoulder, upon this vertebra alone, without being liable to injure the spinal marrow, which would

probably be divided transversely by the first vertebra; so that all the seven vertebrae seem to concur in this motion when it is in any considerable degree.

31
Vertebrae of
the back.

a, We have nothing particular to observe in these vertebrae, which are twelve in number; except two lateral depressions in the sides of each vertebra, and another in each transverse process, by means of which these bones are articulated with the ribs.

32
Lumbar
vertebrae.

a, These five vertebrae differ only from those of the back, in their being larger; and in having their spinous processes at a greater distance from each other. The most considerable motions of the trunk are made on these vertebrae; and these motions could not be performed with so much ease, were the processes placed nearer to each other.

33
Os sacrum.

a, The os sacrum which is composed of five or six pieces in young subjects, becomes one bone in more advanced age.

b, It is nearly of a triangular figure, its inferior portion being bent a little forwards. Its superior part has two oblique processes which are articulated with the last of the lumbar vertebrae; and it has likewise a small spinous process. Its concave or anterior side has many prominences, which are filled up and covered with the muscular and tendinous parts behind.

c, This bone has five pair of holes, which afford a passage to the blood vessels, and likewise to the nerves which are derived from the spinal marrow; for the marrow is continued even in the os sacrum.

d, This bone is united laterally to the ossa innominata or hip-bones, and below to the coccyx.

34
Coccyx.

a, The coccyx, which like the os sacrum, is in young people made up of several distinct parts, usually becomes one bone in the adult state.

b, It serves to support the intestinum rectum; and, by its being capable of some degree of motion at its articulation with the sacrum, and being like that bone bent forwards, we are enabled to sit with ease.

c, This bone is about three inches long; it is broadest at its upper part, and from thence grows narrower to its apex, where it is not bigger than the little finger.

d, This bone, which has got its name from its supposed resemblance to a cuckow's beak; differs very much from the vertebrae, being usually without processes, and having no cavity for the medulla spinalis, or foramina for the passage of nerves.

e, The spine, of which we have now finished the anatomical description, is destined for many and important uses. The medulla oblongata is lodged, in its bony canal, secure from external injury; it defends the thoracic and abdominal viscera; it serves to support the head, and gives a general firmness to the whole trunk.

f, We have before compared it to the letter S, and its different turns will be found to render it not very unlike the figure of that letter.

g, In the neck we see it projecting somewhat forwards to support the head, which, without this assistance, would require a greater number of muscles; through the whole length of the thorax it is carried in a curved direction backwards; and thus adds considerably to the cavity of the chest, and consequently affords more room to the lungs, heart, and large blood vessels. In the loins, the spine again projects forwards in a direction with the centre of gravity; by which

means the body is easily kept in an erect posture; for otherwise we should be liable to fall forwards. But at its inferior part, it again recedes backwards, and helps to form a cavity called the *pelvis*; in which the urinary bladder, intestinum rectum, and other viscera are placed.

h, Whoever contemplates and clearly understands the structure of this part of the human body, cannot but acknowledge that it is admirably adapted to the uses to which it is destined; and that it is evidently the work of a divine author.

i, If this bony column had been formed only of one piece, it would have been much more easily fractured than it is now; and, by confining the trunk to a stiff situation, a variety of motions would have been altogether prevented, which are now performed with ease by the great number of bones of which it is composed.

k, It is firm, and yet to this firmness there is added a perfect flexibility. If it is required to carry a load upon the head, the neck becomes stiff with the assistance of its muscles, and accommodates itself to the load as if it was composed only of one bone. In stooping likewise, or in turning to either side, the spine turns itself in every direction, as if all its bones were separated from each other.

l, In a part of the body which is composed of so great a number of bones, and constructed for such a variety of motion as the spine is, luxation is more to be expected than fracture; and this is very wisely guarded against in every direction, by the many processes which are to be found in each vertebra; and by the cartilages, ligaments, and other means of connection, which we have described as uniting them together.

SECT. II. *Of the BONES of the Thorax.*

a, THE thorax, or chest, is composed of many bones, viz. the sternum, which is placed at its anterior part; twelve ribs on each side which make up its lateral parts; and the dorsal vertebrae, which constitute its posterior part. These last have been already described.

35

a, The sternum is the long bone which extends itself from the upper to the lower part of the breast anteriorly, and to which the ribs and the clavicles are articulated.

36
Of the sternum.

b, In children it is composed of several bones united by cartilages; but as we advance in life, most of these cartilages ossify, and the sternum in the adult state is found to consist only of two pieces; and sometimes becomes one bone. It is, however, generally described as being composed of two parts; one superior, which is broad, thick, and short; and one inferior, which is thinner, narrower, and longer than the other.

c, It terminates at its lower part by a cartilage, which is called the *xiphoid*, or sword-like cartilage; from its supposed resemblance to the point of a sword; but its shape is much more like that of a myrtle leaf.

d, We have already observed, that this bone is articulated with the clavicle on each side; it is likewise joined to the fourteen true ribs; viz. seven on its right, and seven on its left side.

a, The ribs are bones shaped like a bow, which compose the sides of the chest. There are twelve on each side. They are distinguished into true and false ribs; the seven upper ribs, which are articulated to the sternum, are called *true ribs*; and the five lower ones, which

37
Of the ribs.

are

are not immediately attached to that bone, are called *false ribs*.

b, On the inferior and anterior surface of each rib, we observe a sinuosity for the lodgment of an artery, vein, and nerve.

c, The ribs are not bony through their whole length, their anterior part being cartilaginous. They are articulated with the vertebrae and sternum; every rib, or at least the greatest number of them, has at its posterior part, two processes; one at its extremity, by means of which it is articulated with the body of two vertebrae; and another, which is a very evident tuberosity, by which it is articulated with the transverse process of the lowest of these two vertebrae; the first rib is not articulated by its extremity to two vertebrae, being simply attached to the upper part of the first vertebra of the back; the seven superior or true ribs, are articulated anteriorly with the sternum by their cartilages; but the false ribs are supported in a different manner; the eighth, which is the first of these ribs, being attached by its cartilage to the seventh; the ninth to the eighth, &c.

d, The two lowest ribs differ likewise from all the rest in the following particulars: they are articulated with the body of a vertebra, and not with a transverse process; and, anteriorly, their cartilage is loose, not being attached to the cartilages of the other ribs; and this seems to be, because the most considerable motions of the trunk are not performed on the lumbar vertebrae alone, but likewise on the two last vertebrae of the back; so that if these two ribs had been confined anteriorly like the rest, and likewise attached to the bodies of two vertebrae, and to the transverse process, this disposition would have impeded the motion of the two last vertebrae of the back, and consequently affected the motion of the trunk in general.

e, The ribs serve to cover and secure the vital organs, viz. the heart and lungs; without this bony defence, these viscera would be constantly exposed to interruption, and perhaps to injury; which would not fail to be extremely prejudicial to health and even to life; for the functions of those organs are so essential to life, that we cannot long exist without them.

SECT. II. OF THE BONES OF THE PELVIS.

a, THE pelvis is composed of the os sacrum, os coccygis, and two ossa innominata. The two first of these bones were included in our account of the spine, to which they more properly belong.

b, Each os innominatum in children, is composed of three distinct bones; but as they advance in life, the marks of this separation gradually disappear, by the ossification of the cartilages by which they were united to each other, and they become one bone; still, however, continuing to retain the names of *ilium*, *ischium*, and *pubis*, by which their divisions were originally distinguished; and to be described as three distinct bones by all anatomical writers. The os ilium forms the upper and largest part of the bone, the os ischium its posterior and inferior portion, and the os pubis its anterior part.

a, The os ilium is articulated posteriorly to the os sacrum, by a firm cartilaginous substance; and is united to the os pubis before, and to the os ischium below; its superior portion is thin, and terminates in a ridge called the *crista* or *spine* of the ilium, and more commonly known by the name of the *haunch*. This crista rises

up like an arch, being turned somewhat outwards; and from this appearance, the upper part of the pelvis when viewed together, has not been improperly compared to the wings of a phœton.

b, Externally, this bone is unequally prominent and hollowed for the attachment of muscles, and internally, it is smooth and concave; at its lower part there is a considerable ridge on its inner surface. This ridge which extends from the os sacrum, and corresponds with a similar prominence both on that bone and the ischium, forms with the inner part of the ossa pubis, what in midwifery is understood to be the brim of the pelvis.

c, The os ilium has likewise a smaller surface posteriorly, by which it is articulated to the os sacrum.

d, The crista, or spine, which is originally an epiphysis, has two considerable tuberosities; one anteriorly, and the other posteriorly which is the largest of the two; the ends of this spine too, from their projecting more than the parts of the bone below them, are called *spinal processes*; before the anterior spinal process, the spine is hollowed where part of the sartorius muscle is placed; and below the posterior spinal process there is a very large niche in the bone which is the recent subject; has a strong ligament stretched over its lower part from the os sacrum, to the sharp pointed process of the ischium, so that a great hole is formed, through which pass the great sciatic nerve, and the posterior crural vessels under the pyriform muscle, part of which is likewise lodged in this hole.

a, The os ischium, which is a bone of a very irregular figure, is usually divided into its body, tuberosity, and ramus. The body externally forms the inferior and greatest part of the acetabulum; and sends a sharp pointed apophysis backwards, called the *spine of the ischium*. This is the process to which the ligament is attached, which we just now described as forming a great foramen for the passage of the sciatic nerve. The tuberosity is large and irregular, and is placed at the inferior part of the bone, giving origin to several muscles. The tuberosity which is the lowest portion of the trunk, supports us when we sit; from this tuberosity the bone becoming narrower and thinner forms the ramus or branch, which passing forwards and upwards, makes with the ramus of the os pubis a large hole, called the *foramen ovale*; this hole which is closed by a membrane, affords through its whole circumference attachment to muscles.

a, The os pubis which is the smallest of the three bones, is placed at the forepart of the pelvis, where it is united to the os pubis of the other side, by means of a very strong cartilage, and constitutes what is called the symphysis pubis. This bone is distinguished by the body, angle, and ramus. The body, which is the outer part, is joined to the os ilium. The angle comes forwards to form the symphysis, and the ramus is a thin apophysis, which is united to the ramus of the ischium.

b, The three bones we have described as constituting the os innominatum on each side, all concur to form the great acetabulum or cotyloid cavity, which receives the head of the thigh-bone. A little fossa is to be observed in this cavity, in which are placed the mucilaginous glands which serve to lubricate the joint, and facilitate its motions. We are able likewise to discover the impression made by the round ligament, which by

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39
Os ilium.

40
Os ischium.

41
Os pubis.

being

being attached both to this cavity and to the head of the os femoris, helps to secure the latter in the acetabulum.

c, The bones of the pelvis serve to lodge the intestines, urinary bladder, and other viscera; and likewise to unite the trunk to the lower extremities; but besides these uses they are defined in the female subject, for other and more important purposes; and the accoucheur finds in the study of these bones, the great foundation of all midwifery knowledge.

CHAP. IV.

Of the EXTREMITIES.

a, THIS part of the osteology is divided into the upper and lower extremities. We will begin with the first of these.

SECT. i. Of the Upper Extremity.

a, This consists of the shoulder, arm, and hand.

§. 1. Of the BONES of the Shoulder.

a, The shoulder is composed of two bones, the clavicle and scapula.

a, The clavicular or collar bone, so called from its resemblance to the key in use amongst the ancients; is a little curved at both its extremities like an Italic *f*. This bone is about the size of the little finger, but longer, and being of a very spongy substance is very liable to fracture. At its interior part where it is round and thickest, it is articulated to the sternum; and its posterior part, which is flatter and broader than the other, is connected to a process of the scapula called *acromion*.

b, The clavicle serves to regulate the motions of the scapula, by preventing its being brought too much forwards, or carried too far backwards. It affords attachment to several muscles, and helps to cover and protect the subclavian arteries which derive their name from their situation under this bone.

a, The scapula which approaches nearly to a triangular figure, is fixed not unlike a buckler to the posterior part of the true ribs. It is of a very unequal thickness, and like all other broad, flat bones, is somewhat cellular. Exteriously it is convex, and interiorly concave, to accommodate itself to the convexity of the ribs. We observe in this bone three unequal sides. The largest of the three called the *basis*, is turned towards the vertebræ. Another which is less than the former, is below this; and the third which is the least of the three, is at the upper part of the bone. Externally the bone is elevated into a considerable spine, which rising small at the basis of the scapula, becomes gradually higher and broader; and divides the outer surface of the bone into two fossæ. The superior of these, which is the smallest, serves to lodge the supra spinatus muscle; and the inferior fossa which is much larger than the other, gives origin to the infra spinatus. This spine terminates in a broad and flat process at the top of the shoulder, called the *processus acromion*, to which the clavicle is articulated. This process is hollowed at its lower part, to allow a passage to the supra and infra spinati muscles. This bone has likewise another considerable process at its superior part, which from its resemblance to the beak of a bird, is called the *coracoid process*. From the

external side of this coracoid process, a strong ligament passes to the processus acromion; which prevents a luxation of the os humeri upwards.

b, The scapula is articulated to the clavicle and os humeri, to which last it serves as a fulcrum; and by altering its position, it affords a greater scope to the bones of the arm in their different motions. It likewise affords attachment to several muscles, and posteriorly serves as a defence to the thorax.

§. 2. Of the BONES of the Arm.

a, The arm is commonly divided into two parts, which are articulated to each other at the elbow. The upper part retains the name of *arm* properly so called, and the lower part is usually called the *fore arm*.

Art. i. Of the ARM properly so called.

a, The arm is formed of a single bone, called *os humeri*. This bone which is almost of a cylindrical form, may be divided into its body and its extremities.

b, The upper extremity terminates in a large round smooth head, which is admitted into the glenoid cavity of the scapula.

c, The lower extremity has many processes and cavities. The principal processes are its two condyles, one exterior and the other interior, and of these the last is the largest; between these two we observe two lateral protuberances, which together with a middle cavity, form as it were a kind of pulley upon which the motions of the fore arm are chiefly performed. At each side of the condyles, as well exteriorly as interiorly, there is another eminence which affords attachment to several muscles of the hand and fingers. Posteriorly and superiorly, speaking with respect to the condyles, we observe a deep fossa which receives a considerable process of the ulna; and anteriorly, and opposite to this fossa, we observe another which is much less, and receives another process of the same bone.

d, The body of the bone has, at its upper and anterior part, a furrow which begins from behind the head of the bone, and serves to lodge the tendon of a muscle. The body of the os humeri is hollow through its whole length; and like all other long bones, has its marrow.

e, The humerus is articulated at its upper part to the scapula. This articulation, which allows motion every way, is surrounded by a capsular ligament. Its lower extremity is articulated with the bones of the arm.

Art. 2. Of the Fore ARM.

a, The fore arm is composed of two bones, the ulna and radius.

a, The ulna, or elbow bone, is much less than the humerus, and becomes gradually smaller as it descends to the wrist. At its upper part it has two processes and two cavities. Of the two processes, the largest, which is situated posteriorly and called the *olecranon*, is admitted into the posterior fossa of the humerus. The other process is placed anteriorly, and is called the *coronoid process*. In bending the arm it enters into the anterior fossa of the humerus. This process being much smaller than the other, permits the fore arm to bend inwards; whereas the olecranon, which is shaped like a hook, reaches the bottom of its fossa in the humerus

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43

44

45
Of the clavicle.46
Of the scapula.

47

48

49

50

Of the ulna

as soon as the arm becomes straight; and will not permit the fore arm to be bent backwards. The ligaments likewise oppose this motion.

b, Between the two processes which we have described, there is a considerable cavity called the *fygmoid cavity*; and divided into two fossæ by a small eminence which passes from one process to the other; it is by means of this cavity and the two processes, that the ulna is articulated with the humerus by ginglymus.

c, At the bottom of the coronoid process interiorly, there is a small *fygmoid* cavity, which serves for the articulation of the ulna with the radius.

d, The body of the ulna is of a triangular shape, its lower extremity terminates by a small head and a little styloid process. The ulna is articulated above to the os humeri both above and below to the radius; and to the wrist at its lowest extremity. All these articulations are secured by means of ligaments.

a, The radius is placed at the inside of the fore arm; it is somewhat larger than the ulna, but not quite so long as that bone. Its upper part is cylindrical, hollowed superiorly to receive the outer condyle of the os humeri laterally; it is admitted into the little *fygmoid* cavity of the ulna, and the cylindrical part of the bone turns in this cavity in the motions of pronation and supination (a). This bone follows the ulna in flexion and extension, without at all assisting in those motions. The lower extremity of the radius is much larger and stronger than its upper part; the ulna, on the contrary is smaller and weaker below than above, so that they serve to supply each others deficiencies in both these parts.

b, On the external side of this bone, we observe a small cavity which is destined to receive the lower end of the ulna; and its lowest part is formed into a larger cavity, by means of which it is articulated with the bones of the wrist. This bone supports the two first bones of the wrist on the side of the thumb, whereas the ulna is articulated with that bone of the wrist which corresponds with the little finger.

c, Thro' the whole length both of this bone and the ulna, a ridge is observed, which affords attachment to an interosseous ligament. This ligament fills up the space between the two bones.

Art 3. Of the HAND.

a, The carpus or wrist, includes eight bones, disposed in two ranks. Anatomical writers have not only usually described the particular figure of these several bones; but have likewise given to each of them a different name.

b, Such minutæ in this part of the osteology, seem to be unnecessary in this work; and we shall only observe, that they are articulated with the radius and ulna, and likewise with the bones of the fore arm by means of several ligaments.

a, The metacarpus consists of four bones, which support the fingers; externally they are a little convex, and internally somewhat concave, where they form the palm of the hand. They are hollow, and of a cylindrical shape.

b, At each extremity they are a little hollowed for their articulation superiorly with the bones of the car-

pus, and inferiorly with the first phalanx of the fingers, in the same manner as the several phalanges of the fingers are articulated with each other.

a, Every body knows the number and the names of the fingers. The five fingers of each hand are composed of 15 bones, disposed in three ranks called *phalanges*. The bones of the first phalanx, which are articulated with the metacarpus, are the largest; and those of the last phalanx, are the smallest. All these bones are larger at their extremities than in their middle part.

b, We observe at the extremities of the bones of the carpus, metacarpus, and fingers, several inequalities which serve for their articulation with each other; and these articulations are strengthened by means of the ligaments which surround them.

c, It will be easily understood that this multiplicity of bones in the hand (for there are 27 in each hand), is essential to the different motions we wish to perform. If each finger was composed only of one bone instead of three, it would be impossible for us to grasp any thing.

SECT II. Of the Lower Extremities.

a, Each lower extremity is divided into four parts, viz. The os femoris, or thigh bone; the rotula or knee pan; the leg, and the foot.

§. 1. Of the Os Femoris.

a, The thigh is composed only of this bone, which is larger and stronger than any other bone of the body. It will be necessary to distinguish its body and extremities. Its body, which is of a cylindrical shape, is convex before and concave behind; where it serves to lodge several muscles. Throughout two thirds of its length, we observe a ridge called *linea aspera*, which affords insertion to the triceps muscle.

b, At its upper extremity, we must describe the neck and head of the bone, and likewise two considerable processes. The head, which forms the greater portion of a sphere unequally divided, is turned inwards, and is received into the great cotyloid cavity of the os innominatum; at this part of the bone, there is a little fossa to be observed to which the round ligament is attached; and which we have already described as tending to secure the head of this bone in the great acetabulum. The neck is almost horizontal, considered with respect to its situation with the body of the bone. Of the two processes, the external one, which is the largest, is called *trochanter major*; and the other, which is placed on the inside of the bone, is called *trochanter minor*; they both afford attachment to muscles. The articulation of the os femoris with the trunk, is strengthened by means of a capsular ligament, which is attached every where to the surface of the great cotyloid cavity of the os innominatum, and surrounds the head of the bone.

c, The os femoris moves upon the trunk in every direction.

d, At the lower extremity of the bone are two processes, called the *condyles*; and an intermediate cavity, by means of which it is articulated with the leg by ginglymus.

e, Between the condyles, there is a cavity posteriorly

(a) The motions of pronation and supination may be easily described. If the palm of the hand, for instance, is placed on the surface of a table, the hand will be said to be in a state of pronation; but if the back part of the hand is turned towards the table, the hand will then be in a state of supination.

ly in which the blood vessels and nerves are placed secure from the compressions to which they would otherwise be exposed in the action of bending the leg; and which would not fail to be hurtful.

f, At the side of each condyle externally there is a tuberosity; from whence the lateral ligaments originate which are attached to the tibia.

g, A ligament likewise arises from each condyle posteriorly, one of which passes from the right to the left, and the other from the left to the right; so that they intersect each other; and are called the *cross ligaments*.

h, The lateral ligaments prevent the motion of the leg upon the thigh to the right or left, and the cross ligaments, which are also attached to the tibia, prevent its being bent forwards.

i, In new-born children all the processes of this bone are cartilaginous.

§. 2. Of the ROTULA.

a, THE rotula, patella, or knee-pan, as it is differently called; is a bone about four or five inches in circumference, which in some measure resembles the common figure of the heart with its point downwards, and is placed at the fore part of the joint of the knee.

b, It is thicker in its middle part than at its edge; anteriorly it is smooth, and a little convex; its posterior surface, which is more unequal, affords an elevation in the middle which is admitted between the two condyles of the os femoris.

c, This bone is retained in its proper situation by a ligament which every where surrounds it, and is attached both to the tibia and os femoris; and likewise by the tendons of several muscles, which do not however prevent its sliding from above downwards, and from below upwards.

d, In very young children this bone is entirely cartilaginous.

e, The use of this bone seems to be, to defend the articulation of the knee from external injury; it likewise tends to increase the power of the muscles which act in the extension of the leg, by removing their direction farther from the centre of motion in the manner of a pulley.

§. 3. Of the LEG.

a, THE leg is composed of two bones; of these the inner one, which is the largest, is called *tibia*; the other is much smaller, and is called the *fibula*.

b, The tibia, which derives its name from its resemblance to the musical pipe of the ancients, has three surfaces, and is not very unlike a triangular prism; its posterior surface is the broadest; anteriorly it has a considerable ridge called the *spin*, between which and the skin there are no muscles; at the upper extremity of this bone are two surfaces, a little concave, and separated from each other by an intermediate elevation; the two little cavities receive the condyles of the os femoris, and the eminence between them is admitted into the cavity which we spoke of as being between the two condyles, so that this articulation affords a specimen of the complete ginglymus. Under the external edge of the upper end of this bone, is a circular flat surface which receives the head of the fibula.

b, At the lower and inner portion of the tibia, we observe a considerable process called *malleolus internus*; the basis of the bone terminates in a large transverse cavity, by which it is articulated with the uppermost bone of the foot; it has likewise another cavity at its lower end and outer side; which is somewhat oblong, and receives the lower end of the fibula.

c, The tibia is hollow through its whole length.

a, The fibula is a small long bone, placed on the outside of the tibia; its upper extremity does not reach quite so high as that part of the tibia, but its lower end descends somewhat lower; both above and below, it is articulated with the tibia by means of the lateral cavities which we observed in our description of that bone.

b, Its lower extremity is stretched out into a coronoïd process, which is flattened at its inside, and is convex externally, forming what is called the *malleolus externus*, or outer angle; this is rather lower than the *leolus internus* of the tibia.

c, The body of this bone, which is irregularly triangular, is a little hollowed at its internal surface, which is turned towards the tibia; and it affords like that bone, through its whole length, attachment to a ligament, which from its situation is called the *interosseous ligament*.

§. 4. Of the BONES of the Foot.

a, The bones of the foot, as well as those of the hand, are usually described in three divisions, but with different names; in the hand we spoke of the *carpus*, *metacarpus*, and *fingers*; but the divisions of the foot are called the *tarsus*, *metatarsus*, and *toes*.

Art. 1. Of the Tarsus.

a, THE tarsus is composed of seven bones, *viz.* The astragalus, os calcis, os naviculare, os cuboides, and three others called *cuneiform bones*.

a, The astragalus is a considerable bone, with which both the tibia and fibula are articulated; it is the uppermost bone of the foot, and has several surfaces to be considered. Its upper, and somewhat posterior part, which is smooth and convex, is admitted into the cavity of the tibia; its lateral parts are connected with the malleoli of the two bones of the leg; below, it is articulated with the os calcis; and its anterior surface is received by the os naviculare: all these articulations are secured by means of ligaments.

a, The os calcis, or calcaneum, which is the largest bone of the foot, is of a very irregular figure; behind, it is formed into a considerable tuberosity called the *heel*; without this tuberosity which supports us in an erect posture, and when we walk, we should be liable to fall backwards.

b, On the interval surface of this bone, we observe a considerable sinuosity which affords a passage to the tendon of a muscle; and to the posterior part of the os calcis a strong tendinous cord called *tendo achillis* (s) is attached, which is formed by the tendons of several muscles united together: the articulation of this with the other bones is secured by means of ligaments.

a, The os naviculare, or scaphoides (for these two terms have the same signification), is so called on account of its resemblance to a little bark. At its posterior part,

(s) This tendon is sometimes ruptured by jumping, dancing, or other violent efforts.

part, which is concave, it receives the astragalus; anteriorly it is articulated with the cuneiform bones, and laterally it is connected with the os cuboides.

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Of the os
cuboides.

a, The os cuboides forms an irregular cube. Posteriorly it is articulated with the os calcis; anteriorly it supports the two last bones of the metatarsus; and laterally it joins the third cuneiform bone and the os naviculare.

68
Of the ossa
cuneiformia.

a, Each of these bones, which are three in number, resembles a wedge, and from this similitude their name is derived. They are placed next to the metatarsus by the sides of each other, and are usually distinguished into *os cuneiforme externum, medium or minimum, and internum or maximum*. The superior surface of these bones, from their wedge-like shape, is broader than that which is below, where they help to form the sole of the foot; posteriorly they are united to the os naviculare, and anteriorly they support the three first metatarsal bones.

b, the os cuneiforme externum is joined laterally to the os cuboides.

c, These bones complete our account of the tarsus; and though what we have said of this part of the osteology has been very simple and concise, yet, many readers may not clearly understand it; but if they will be pleased to view these bones in their proper situation in the skeleton, all that we have said of them will be easily understood.

Art. 2. Of the Metatarsus.

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a, The metatarsus is made up of five bones, whereas the metacarpus consists only of four. The cause of this difference is, that in the hand, the last bone of the thumb is not included among the metacarpal bones, whereas in the foot the great toe has only two bones. The first of these bones supports the great toe, and is much larger than the rest, which nearly resemble each other in size.

b, These bones are articulated by one extremity with the cuneiform bones, and the os cuboides, and their other end, with the toes.

Art. 3. Of the BONES of the Toes.

a, All the fingers like the toes, are made up of three bones, except the great toe, which is composed only of two bones; and they are likewise distinguished into three phalanges: although these bones do not move upon each other with so much ease as the bones of the fingers do, yet their number and arrangement seem to be perfectly adapted to the functions which they are intended to perform. Thus we observe, that the soles of the feet are naturally concave, and that we can at pleasure increase this concavity, and form a kind of vault which adjusts itself to the different inequalities, which occur to us in walking; and which without this mode of arrangement would incommode us exceedingly, especially when bare footed.

OF THE OSSA SESAMOIDEA.

a, Besides the bones we have already described, there are others of different figures and sizes, met with only in the adult skeleton; and in persons who are advanced in life, which from their supposed general resemblance to the seeds of the sesamum, are called *ossa sesamoidea*; they are found at the articulations of the great toes, and sometimes at the joints of the thumbs; in the articulation of the metacarpus with the little finger; sometimes in the little cavity which is at the exterior part of the outer condyle of the thigh, and under the os cuboides of the tarsus in the tendon which is attached there: age and hard labour seem to add to the number and size of these bones, and being most commonly found wherever the tendons and ligaments are most exposed to pressure from the action of the muscles, they are now generally considered by anatomists as the ossified parts of tendons and ligaments.

EXPLANATION OF THE PLATES OF OSTEOLOGY.

PLATE XIII.

FIGURE 1. A MALE SKELETON.

A, Os frontis. B, Os parietale. C, Os temporum. D, Os occipitis. E, Offa nasi. F, Os maxilæ. G, Os maxillare superius. H, Os maxillare inferius. I, The teeth, which are sixteen in each jaw. K, The seven vertebrae of the neck, with their intermediate cartilages. L, &c. The twelve dorsal vertebrae, with their intermediate cartilages. M, The five lumbar vertebrae, and N, their intermediate cartilages. O, Os sacrum. P, Os coccygis. Q, Os ilium. R, Os pubis. S, Os ischium. T, The seven true ribs. U, The five false ribs. V, The sternum. X, The clavicle. Y, The scapula. Z, The os humeri. a, Ulna. b, Radius. c, The eight bones of the carpus. d, The five metacarpal bones. e, The phalanges of the fingers. f, The os femoris. g, The patella. h, The tibia. i, The fibula. k, The seven bones of the tarsus. l, The five metatarsal bones. m, The phalanges of the toes.

FIG. 2. The internal view of the Os FRONTALIS.

a, The superior serrated edge, which affords to form the coronal suture. b, The external angular process. c, The internal angular process. d, The nasal process. e, The orbital process. f, The frontal sinus. g, The sagittal suture, which (as here) is sometimes continued to the nose.

VOL. I.

FIG. 3. The internal side of the left PARIETAL bone.

a, Its superior edge, which, joined with the other, forms the sagittal suture. b, The anterior edge, which assists in the formation of the coronal suture. c, The inferior edge for the squamous suture. d, The posterior edge for the lambdoid suture. e, A depression made by the lateral sinus. f, The prints of the principal artery of the dura mater.

FIG. 4. The internal view of the OCCIPITAL bone.

a a, The two sides, which assist to form the lambdoid suture. b, The extremity of the cuneiform process, where it joins the sphenoid bone. c c, The two condyloid processes, which articulate the head with the spine. d d, The prints made by the posterior lobes of the brain. e e, The prints made by the lobes of the cerebellum. f, The cruciform ridge. g, The foramen magnum, thro' which the spinal marrow passes. h, The foramen linguale, for the passage of the ninth pair of nerves.

FIG. 5. The internal side of the right TEMPORAL bone.

a, The upper edge which forms the squamous suture. b, The pars mammillaris. c, The pars patrosa. d, The zygomatic process. e, The styloid process. f, The entry of the auditory nerve.

Y y

FIG. 6.

FIG. 6. The internal view of the SPHENOID bone. aa, The temporal processes. bb, The pterygoid processes. cc, The spinous processes. dd, The posterior clinoid processes. ee, The anterior clinoid processes. f, The fella turcica, for lodging the glandula pituitaria. g, The anterior process, which joins the ethmoid bone.

FIG. 7. The exterior view of the ETHMOID bone. a, The pars plana, which forms part of the orbit. b, The os spongiosum superius. c, The nasal lamella. d, The ethmoid cells. e, Crista galli.

FIG. 8. The posterior view of the OSSA NASI. a, Their superior sides. b, Their inferior sides. c, Their exterior sides. d, Their joining.

FIG. 9. The side of the Os UNGUIS next to the nose.

a, The orbital part. b, The lachrymal part. c, The furrow between these two convex parts.

FIG. 10. The posterior view of the right Os MALÆ. a, The superior orbital process. b, The inferior orbital process. c, The malar process. d, The zygomatic process. e, The internal orbital process.

FIG. 11. A view of the lower part, and side next to the nose, of the right Os MAXILLARE, with the PALATE-BONE, and Os SPONGIOSUM INFERIUS.

a, The nasal process. b, The tuber, at the top of which is the orbital process, and within it, k, The antrum maxillare. c, The nasal spine. d, The os spongiosum inferius. e, The palate-plate. f, The os palati. g, The two dentes incisores. h, The dens caninus. i, The five dentes molares.

FIG. 12. The right PALATE-BONE. a, The palate-plate. b, The pterygoid process. c, The nasal lamella. d, The orbital process.

FIG. 13. A view of the side next to the mouth of the left side of the lower jaw.

a, The substance in the middle of the chin. b, The base. c, The angle. d, The coronoid process. e, The condyloid process. f, The entry of the nerve and blood-vessels. g, The five molares.

FIG. 14. A TOOTH cut perpendicularly. a, The fibres of the enamel. b, The osseous part. c, The entry at the point of the root, to d, The channel for the nerve and blood-vessels.

FIG. 15. A view of the interior surface of the BASE of the SCULL.

AAA, The two tables of the skull, with the diploe. BB, The orbital processes of the frontal bone. C, The crista galli, with the cribriform-plate of the ethmoid bone on each side of it. D, The cuneiform process of the os occipitis. E, The cruciform ridge. F, The foramen magnum for the passage of the medulla spinalis. G, The zygoma, made by the joining of the zygomatic processes of the ossa temporum and occipitis. H, The pars squamosa of the os temporum. I, The pars mammillaris. K, The pars petrosa. L, The temporal process of the sphenoid bone. M, The anterior clinoid process of the right side. N, The posterior clinoid process of the right side, and between them, O, The fella Turcica. 1. The foramen opticum of the left side. 2. The foramen lacerum. 3. The foramea rotundum.

FIG. 16. The frontal, occipital, sphenoid, and ethmoid bones, being cut perpendicularly thro' the middle, and the nasal, maxillary, and palate bones separated from each other, the interior view of the left side of the CRANIUM, and bones of the UPPER JAW, are represented.

A A, The two tables and diploe of the frontal and occipital bones. B, The coronal suture. C, The serrated edges of the parietal, for forming the sagittal suture. D, The lambdoid suture. E, The squamous suture. F, The furrows made by the vessels of the dura mater. G, The frontal sinus. H, The crista galli. I, The nasal lamella of the ethmoid bone. K, The temporal process of the sphenoid bone. L, The fella turcica. M, The sphenoid sinus. N, The vomer. O, The palate-plate of the superior maxillary bone; and from it the processus alveolaris, which contains the teeth. P, The os nasi. Q, The passage into the left nostril. 1. The meatus auditorius internus for the passage of the auditory nerve. 2. The passage of the ninth pair of nerves. 3. The foramen incisum.

FIG. 17. The external surface of the base of the CRANIUM and UPPER JAW.

A A, The lambdoid suture. B, The superior horizontal ridge of the occipital bone, which is opposite to the cruciform ridge, where the superior longitudinal sinus divides to form the lateral sinuses. C, The perpendicular ridge. D, The inferior horizontal ridge. E, The foramen magnum, for the passage of the medulla spinalis. FF, The two condyles. G, The cuneiform process. HH, The zygomatic process of the temporal bone. II, The mastoid processes. K, The vomer, which forms the back-part of the septum nasi. L L, The styloid processes. M M, The fossæ at the root of the mastoid processes, for the posterior belly of the digastric muscle. N N, The cavities for receiving the condyles of the lower jaw. O O, The ossa palati. P, The longitudinal palate-suture. Q, The transverse palate-suture. R, The alveoli, or spongy sockets for the teeth. S, The zygomatic process of the ossa malarum. T T, The zygomatic suture. 1. Meatus auditorius externus. 2. Hole for the internal carotid artery. 3. For the artery of the dura mater. 4. Foramen ovale, for the third branch of the fifth pair, to the upper jaw.

PLATE. XIV.

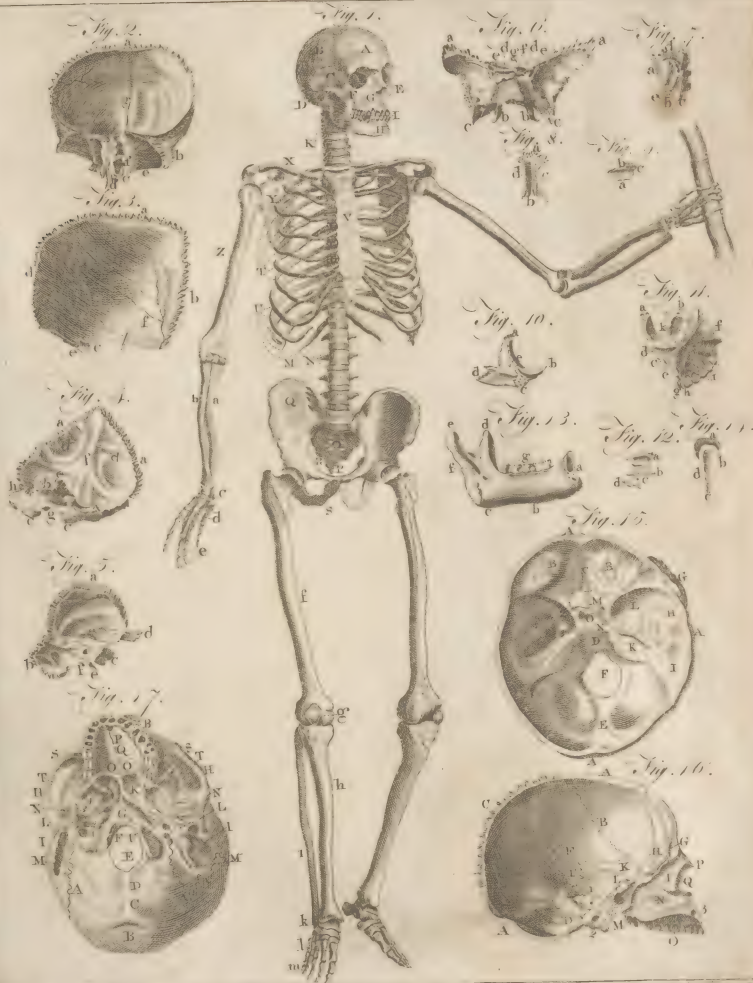
FIG. 1. A posterior view of the STERNUM and CLAVICLES, with the ligament connecting the clavicles to each other.

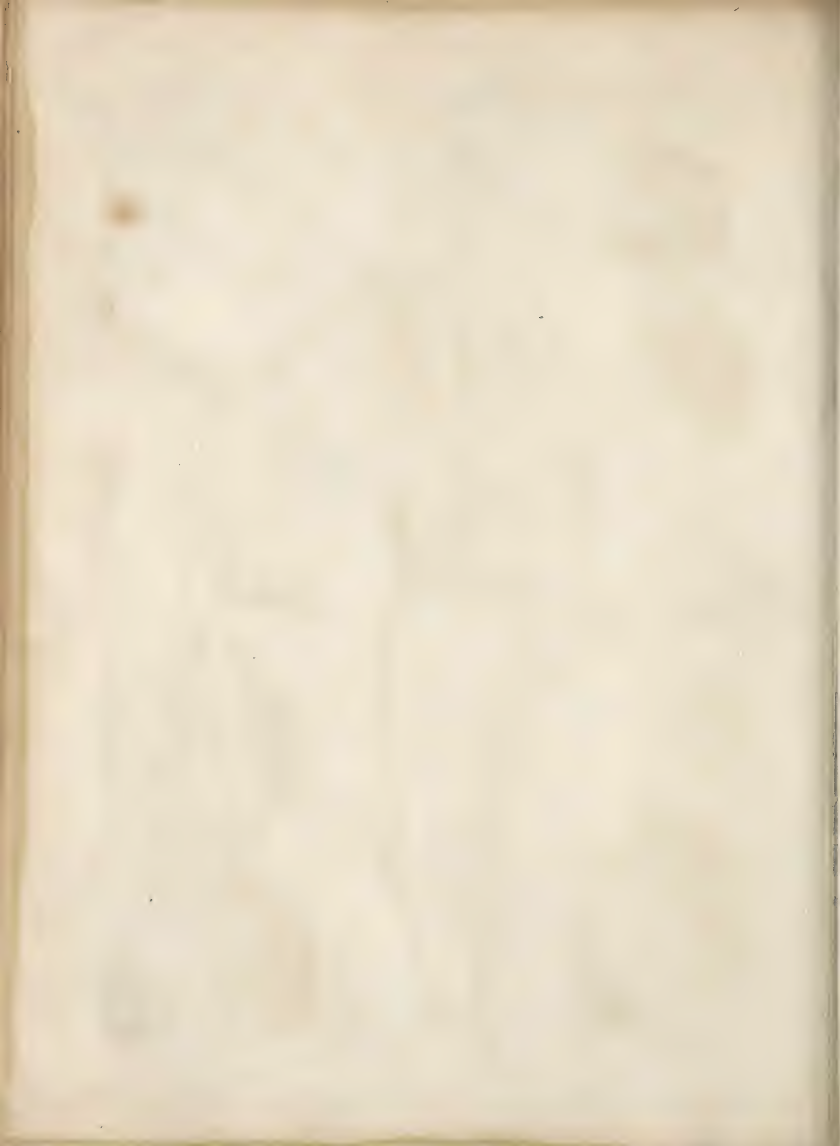
a, The posterior surface of the sternum. bb, The broken ends of the clavicles. c c c, The tubercles near the extremity of each clavicle. d, The ligament connecting the clavicles.

FIG. 2. A fore view of the LEFT SCAPULA, and of a half of the CLAVICLE, with their ligaments.

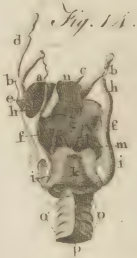
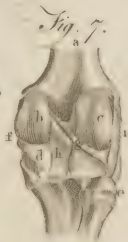
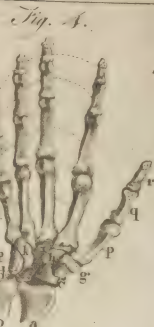
a, The spine of the scapula. b, The acromion. c, The inferior angle. d, Inferior costa. e, Cervix. f, Glenoid cavity, covered with cartilage for the armbone. g g, The capsular ligament of the joint. h, Coracoid process. i, The broken end of the clavicle. k, Its extremity joined to the acromion. l, A ligament coming out single from the acromion to the coracoid process. m, A ligament coming out single from the

Plate XIII









the acromion, and dividing into two, which are fixed to the coracoid process.

FIG. 3. The joint of the elbow of the LEFT ARM, with the ligaments.

a, The os humeri. b, Its internal condyle. cc, The two prominent parts of its trochlea appearing through the capsular ligament. d, The ulna. e, The radius. f, The part of the ligament including the head of the radius.

FIG. 4. The Bones of the RIGHT-HAND, with the PALM in view.

a, The radius. b, The ulna. c, The scaphoid bone of the carpus. d, The os lunare. e, The os cuneiforme. f, The os pisiforme. g, Trapezium. h, Trapezoides. i, Capitatum. k, Unciforme. l, The four metacarpal bones of the fingers. m, The first phalanx. n, The second phalanx. o, The third phalanx. p, The metacarpal bone of the thumb. q, The first joint. r, The second joint.

FIG. 5. The posterior view of the bones of the LEFT HAND.

The explication of Fig. 4. serves for this figure; the same letters pointing out the same bones, though in a different view.

FIG. 6. The upper extremity of the TIBIA, with the femur cartilages of the joint of the knee, and some ligaments.

a, The strong ligament which connects the rotula to the tubercle of the tibia. b b, The parts of the extremity of the tibia, covered with cartilage, which appear within the femur cartilages. c c, The femur cartilages. d, The two parts of what is called the croix ligament.

FIG. 7. The posterior view of the joint of the RIGHT KNEE.

a, The os femoris cut. b, Its internal condyle. c, Its external condyle. d, The back-part of the tibia. e, The superior extremity of the fibula. f, The edge of the internal femur cartilage. g, An oblique ligament. h, A larger perpendicular ligament. i, A ligament connecting the femur and fibula.

FIG. 8. The anterior view of the joint of the RIGHT KNEE.

b, The internal condyle. c, Its external condyle. d, The part of the os femoris, on which the patella moves. e, A perpendicular ligament. f f, The two parts of the crucial ligaments. g g, The edges of the two moveable femur cartilages. h, The tibia. i, The strong ligament of the patella. k, The back part of it where the fat has been dissected away. l, The external depression. m, The internal one. n, The cut tibia.

FIG. 9. A view of the inferior part of the bones of the RIGHT FOOT.

a, The great knob of the os calcis. b, A prominence on its outside. c, The hollow for the tendons,

nerves, and blood-vessels. d, The anterior extremity of the os calcis. e, Part of the astragalus. f, Its head covered with cartilage. g, The internal prominence of the os naviculare. h, The os cuboidei. i, The os cuneiforme internum; k, —Medium; l, —Externum. m, The metatarsal bones of the four lesser toes. n, The first—o, The second—p, The third phalanx of the four lesser toes. q, The metatarsal bones of the four lesser toes. n, The first—o, The second. p, The third phalanx of the four lesser toes. q, The metatarsal bones of the great toe. r, Its first—s, Its second joint.

FIG. 10. The inferior surface of the two large SESAMOID BONES, at the first joint of the great toe.

FIG. 11. The superior view of the bones of the RIGHT FOOT.

a, b, as in Fig. 9. c, The superior head of the astragalus. d, &c. as in Fig. 9.

FIG. 12. The view of the Sole of the Foot with its ligaments.

a, The great knob of the os calcis. b, The hollow for the tendons, nerves, and blood-vessels. c, The sheaths of the flexores pollicis, and digitorum longi opened. d, The strong cartilaginous ligament supporting the head of the astragalus. e, h, Two ligaments which unite into one, and are fixed to the metatarsal bone of the great toe. f, A ligament from the knob of the os calcis to the metatarsal bone of the little toe. g, A strong triangular ligament, which supports the bones of the tarsus. i, The ligaments of the joints of the five metatarsal bones.

FIG. 13. a, The head of the thigh bone of a child. b, The ligamentum rotundum connecting it to the acetabulum. c, The capsular ligament of the joint with its arteries injected. d, The numerous vessels of the mucilaginous gland injected.

FIG. 14. The back view of the cartilages of the LARYNX, with the Os Hyoides.

a, The posterior part of the base of the os hyoides. b b, Its cornua. c, The appendix of the right side. d, A ligament sent out from the appendix of the left side, to the styloid process of the temporal bone. e, The union of the base with the left cornu. f f, The posterior sides of (g) the thyroid cartilage. h h, Its superior cornua. i i, Its inferior cornua. k, The cricoid cartilage. l l, The arytenoid cartilages. m The entry into the lungs, named *glottis*. n, The epiglottis. o o, The superior cartilages of the trachea. p, Its ligamentous back-part.

FIG. 15. The superior concave surface of the SESAMOID BONES at the first joint of the great toe, with their ligaments.

a, Three sesamoid bones. b, The ligamentous substance in which they are formed.

PART II. OF THE SOFT PARTS IN GENERAL;

AND

OF THE COMMON INTEGUMENTS.

a, ANATOMICAL writers usually proceed to a description of the muscles after having finished

the osteology; but we shall deviate a little from the common method, with a view to describe every thing clear-

ly and distinctly, and to avoid a tautology which would otherwise be unavoidable. All the parts of the body are so intimately connected to each other, that it seems to be impossible to convey a just idea of any one of them, without being in some measure obliged to say something of others; and on this account, we wish to mention in this place, the names and situation of the principal viscera of the body; that when mention is hereafter made of any of them in the course of this treatise, the reader may at least know where they are placed.

b, After this little digression, the common integuments, and after them the muscles, will be described; we then propose to enter into an examination of the several viscera and their different functions. In describing the brain, occasion will be taken to speak of the nerves and animal spirits. The circulation of the blood will follow the anatomy of the heart, and the secretions and other matters will be introduced in their proper places.

c, The body is divided into three great cavities. Of these,

d, The uppermost is formed by the bones of the cranium, and incloses the brain and cerebellum.

e, The second is composed of the vertebrae of the back, the sternum and true ribs, with the additional assistance of muscles, membranes and common integuments, and is called the *thorax*. It contains the heart and lungs. The third and inferior cavity is the abdomen. It is separated from the thorax by means of the diaphragm, and is formed by the lumbar vertebrae, the os sacrum, the ossa innominata, and the false ribs; to which we may add the peritoneum, and a variety of muscles. This cavity incloses the stomach, intestines, omentum or cawl, liver, pancreas, spleen, kidneys, urinary bladder, and parts of generation.

f, Under the division of common integuments, are usually included the epidermis, or scarf skin; the reticulum mucosum of Malpighi; the cutis, or true skin; and the membrana adiposa. The hair and nails, as well as the milary and sebaceous glands, may be considered as appendages to the skin.

CHAP. I.

Of the EPIDERMIS.

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a, THE epidermis, cuticula or scarf skin, is a fine, transparent, and insensible pellicle; destitute of nerves and blood-vessels, which invests the body, and every where covers the true skin. This scarf skin which appears to be very simple, is composed of several laminae or scales, which are increased by pressure, as we observe in the hands and feet; where it is frequently much thickened, and becomes perfectly callous. It may be separated from the true skin by heat, or by maceration in water (τ). Some anatomical writers have supposed that it is formed by a humidity exhaled from the whole

surface of the body, which gradually hardens when it comes into contact with the air. They were perhaps induced to adopt this opinion, by observing the speedy regeneration of this part of the body when it has been by any means destroyed; it appearing to be renewed in all parts of its surface at the same time, whereas other parts which have been injured, are found to direct their circumference only towards their center; but a demonstrative proof that the epidermis is not a viscid humour hardened by means of the external air, is, that the foetus in utero is found to have this covering. Its true origin seems to be from the expansion of the extremities of the excretory vessels, which are found every where on the surface of the true skin (υ). And this formation seems to explain the cause of its quick growth.

b, It is pierced with an infinite number of pores, or little holes, which afford a passage to the hairs, sweat, and insensible perspiration; and likewise to warm water, mercury, and whatever else is capable of being taken in by the absorbents of the skin. The lines which we observe on the epidermis belong to the true skin. The cuticula adjusts itself to them, but does not form them.

CHAP. II.

Sect. i. Of the RETICULUM MUCOSUM.

a, THIS is a very fine membrane, pierced with an infinite number of pores, and moistened by a mucus which is supposed to transude from the surface of the true skin.

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b, the colour of the body is found to depend on the colour of the reticulum mucosum; for in negroes it is observed to be perfectly black, whilst the true skin is of the ordinary colour.

c, The blisters which raise the skin when burnt or scalded, are probably occasioned by the rarefaction of this mucus.

Sect. ii. Of the CUTIS, or TRUE SKIN.

a, The cutis is composed of tendinous fibres closely compacted together, as we may observe in leather, which is the prepared skin of animals. These fibres form a thick cellular network, which every where admits the filaments of nerves, and an infinite number of blood-vessels and lymphatics.

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b, The cutis, when the epidermis is taken off, is found to have throughout its whole surface innumerable tendinous papillae, which appear like very minute granulations, and seem to be calculated to receive the impressions of the touch; being the most easily observed where the sense of feeling is the most delicate, as in the palms of the hands, and on the fingers.

c, These papillae which are described as being of a pyramidal figure, are supposed by many anatomical writers to be continuations of the pulpy substance of nerves,

(τ) The ingenious Mr Gooch relates the case of a gentleman in Norfolk, who has been frequently attacked by a peculiar kind of fever, which has constantly produced an universal separation of the cuticle from the skin. This separation, which begins to take place within twenty-four hours from the first attack of the fever, is usually completed within ten or twelve days, leaving the skin for sometime exquisitely sensible. The patient has sometimes turned off the cuticle from the wrists to his fingers ends like gloves. One of these cuticular gloves, with an account of the case having been transmitted to the members of the Royal Society, they have given an engraving of it in their transactions. See the Phil. Trans. and Gooch's Med. and Chirurg. Observ.

(υ) This was Leuwenhoeck's opinion. Ruysch attributed its origin to the nervous papillae of the skin, and Heister thinks it probable that it may owe its formation both to the papillae and the excretory vessels.

nerves, whose coats have terminated in the cellular texture of the skin. The great sensibility of these papillæ evidently proves them to be exceedingly nervous; but surely the nervous fibrillæ of the skin are of themselves scarcely equal to the formation of these papillæ; and it seems to be more probable that they are formed like the rest of the cutis.

d. These papillæ being desiried, the uses of the epidermis and the reticulum mucosum will be more easily understood; the latter serving to keep them constantly moist, whilst the former protects them from the external air, and modifies their too great sensibility.

SECT. iii. Of the GLANDS of the Skin.

a. We meet with two sorts of glands in the skin, viz. the sebaceous, and miliary glands.

a. These are certain membranous vesicles, or small cylindrical tubes, continued from the ends of arteries, and discharging a fat and oily humour which serves to lubricate and soften the skin. When this humour is collected and long retained in these tubes, it inspissates; and by enlarging the tubes, gives them the spherical figure which has occasioned them to be called *glands*; and when the fluid they secrete has acquired a certain degree of thickness, it approaches to the colour and consistence of suet: from this appearance they have derived their name of *sebaceous glands*.

b. They are found seated in all parts of the body that are under a necessity of being more immediately exposed to the air; as in the face, and wherever the skin is liable to much attrition, as in the arm-pits, groin, &c. and it is the humour they secrete which discolors our linen when we are long without changing it.

a. These glands which are called *miliary*, from their resembling millet seeds; are described as small spherical bodies placed in all parts of the skin in much greater abundance than the sebaceous glands. Each of these little glands has its excretory duct, which passing thro' the reticulum mucosum, opens on the surface of the scarf skin, and disills the sweat and matter of insensible perspiration.

b. Besides the excretory vessels which are derived from these glands for the purposes of perspiration, it seems probable that a constant exhalation is carried on from the extremities of the minute arteries which are every where dispersed thro' the skin.

a. It will perhaps not be difficult to explain how these processes in the animal economy are conducted. The blood being carried by the circulation to the minute arteries of the cutis, discharges itself of those subtle parts which are capable of passing through the little vessels which open on the surface of the skin. These exhaling vessels are easily demonstrated in the dead subject by throwing water into the arteries; for then small drops exude from all parts of the skin and

raise up the cuticle, the pores of which are closed by death; and in the living subject, a looking-glass placed against the skin is soon obscured by the vapour.

b. When the perspiration is by any means increased, and several drops which were insensible when separate, are united together and condensed by the external air, they form upon the skin small but visible drops called *sweat*. This particularly happens after much exercise; the motion of the blood being then accelerated, and more of it carried to the extremities of the vessels, a greater quantity of the perspirable matter is consequently forced thro' the passages which are destined to carry it off. So that the skin is found to serve as an emunctory, thro' which the redundant water and sometimes other more saline parts of the blood become unfit for circulation are carried off; but perspiration is not confined to the skin only; a great part of what we are constantly throwing off in this way is from the lungs. The quantity of humour exhaled from the human body by this insensible perspiration is very considerable. Sanctorius (x) an Italian physician, who indefatigably passed a great many years in a series of statical experiments, demonstrated long ago what has been confirmed by later observations; that the quantity of vapour exhaled from the skin, and from the surface of the lungs, amounts nearly to 5-8ths of the aliment we receive. So that if in the warm climate of Italy, a person eats and drinks the quantity of eight pounds in the course of a day, five pounds of it will pass off by insensible perspiration, while three pounds only will be evacuated by stool, urine, the saliva, &c. But in countries where the degree of cold is greater than in Italy, the quantity of perspired matter is less. In some of the more northern climates it is found not to equal the discharge by urine. It is likewise observed to vary according to the season of the year, and according to the constitution, age, sex, diseases, diet, exercise, passions, &c. of different people.

c. From what has been said on this subject, it will be easily conceived that this evacuation cannot be either much increased or diminished in quantity without affecting the health. If it is too copious, the mass of blood is soon deprived of its most subtle parts, and flows with less freedom; the solids being consequently rendered more dry and rigid. And if, on the contrary, the quantity of perspirable matter is diminished, it is either carried off thro' some other channels, or is liable to produce a variety of diseases which will be found to vary according to the season of the year, and the constitution of the body.

d. This perspirable matter and the sweat, for they are both evidently discharged thro' the same passages, and differ only in quantity, are analogous to the urine; as appears from their taste and saline nature (y). And it is worthy of observation, that when either of these

(x) The insensible perspiration is sometimes distinguished by the name of this physician, who was born in the territories of Venice, and was afterwards a professor in the university of Padua. After estimating the aliment he took in, and the sensible secretions and discharges, he was enabled to ascertain with great accuracy the weight or quantity of insensible perspiration, by means of a statical chair which he contrived for this purpose: and from his experiments, which were conducted with great industry and patience, he was led to determine what kinds of solid or liquid aliment increased or diminished it. From these experiments he formed a system, which he published at Venice in 1674, in the form of aphorisms, under the title of "Ars de Medicina Statica." Baron Haller in his *Bibliotheca Anatomica*, enumerates no less than 27 editions of this work; of which, 19 are of the Latin original, and the others, translations of it into different languages.

(y) Minute chrystals have been observed to shoot upon the cloaths of men who work in glass-houses. Haller Elem. Phys.

secretions is increased in quantity, the other is diminished; so that they who perspire the least, usually pass the greatest quantity of urine, and vice versa.

SECT. v. Of the NAILS.

a, The nails are bodies of a hard and compact nature, resembling horn; formed by a continuation of the papillæ of the skin, which enlarging, unite together and gradually harden.

b, The origin of the nails may be easily demonstrated, by gently boiling the hands or feet of the human subject in water; for, by separating the nails from the skin after this process, they will be found adhering to the papillæ from which they are produced.

c, The nails increase from their roots, and not from their upper extremity. That part of a nail which is farthest from the root, is the hardest and least sensible. We cut, for instance, the upper end of a nail without exciting any sensation, whilst the most exquisite pain is occasioned by cutting it near its root; that is, near the papillæ from which it derives its origin.

d, The nails serve to cover and defend the ends of the fingers from external injury, and are useful to us when we take hold of small and delicate bodies; which without their assistance we should not always be able to accomplish.

SECT. vi. Of the HAIR.

a, The hairs, which from their being generally known, do not seem to require any definition; arise from distinct capsules or cartilaginous bulbs seated in the interior part of the skin (z). Some of the bulbs inclose several hairs. They may be observed at the roots of the hairs which form the beard or whiskers of a cat.

b, The hairs, like the nails, grow only from below by a regular propulsion from their root where they receive their nourishment. Their bulbs, when viewed with a microscope (A), are observed to be of an oval shape. The bodies of the hairs, which are the parts without the skin, vary in softness and colour according to the difference of climate, age, or temperament of

body (b).

c, In old people the hair usually falls. This event seems to be occasioned by the almost constant dryness which accompanies old age, and gradually hardens all the solid parts of the body. The bulbs of the hair partaking of this change, concrete and become impenetrable to any supply of nourishment. The hairs in consequence of this want of moisture fall out; and if we sometimes see instances of people who preferve their hair at a very advanced age, they are to be attributed to an uncommon degree of humidity in the constitution, which prolongs the suppleness of all the parts. Many people believe that both the hair and the nails grow after death; but this opinion is contradictory to experience.

d, Their general use in the body does not seem to be absolutely determined; but hairs in particular parts, as on the eye-brows and eye-lids, are destined for particular uses, which will be mentioned when those parts are described.

SECT. vii. Of the MEMBRANA ADIPOSA.

a, This membrane, which is likewise called the *cellular* (c) or *reticular membrane*; may be considered as the last of the common integuments; it is every where found under the surface of the true skin, and is composed of an infinite number of minute cells united together, and communicating with each other (d). These cells serve as reservoirs to the oily part of the blood, called *fat*; which is deposited in them by particular vessels, continued from the ends of arteries.

b, The fullness and size of the body are in a great measure proportioned to the quantity of fat contained in these cells; and it seems to be an improper mode of expression to say, that such a one is well in flesh, instead of saying he is fat; for an increase in bulk does not at all add to the size of the flesh, which is made up of the muscles. He who is less disposed to be fat appears to be more muscular; and has indeed commonly stronger and finer muscles than he who is fat.

c, The adeps seems to be renewed by a constant absorption and deposition of it by the vessels destined for that

Phys.—But this may with as great reason be supposed to proceed from the evaporation of the saline matter used in the composition of glass; as no sort of salt is found to be fixed enough for resisting the violent heat required in glass-making.

(z) Malpighi, and after him the celebrated Ruysch, supposed the hairs to be continuations of nerves; being of opinion that they originated from the papillæ of the skin, which are universally allowed to be nervous; and as a corroborating proof of what they advanced, they argued the pain we feel in plucking them out; but later anatomists seem to have rejected this doctrine, and consider the hairs as particular bodies, not arising from the papillæ (for in the parts where the papillæ abound most there are no hairs) but from bulbs or capsules, which are peculiar to them.

(A) It seems to be much easier to suppose, than to demonstrate, the appearance of the constituent parts of minute bodies like the hairs, which require the assistance of the microscope in examining their anatomical structure. M. Winslow has described the membrane which invests the bulb, and the structure of the bulb itself, as it appears thro' the microscope; but neither the uses nor the anatomy of the hair seem to be perfectly understood. The manner in which they are affected in the plica polonica seems to prove them to be pervious thro' their whole length, and they may perhaps serve some useful purposes in perspiration.

(b) The hairs likewise differ from each other, and may not be improperly divided into two classes; one of which may include the hair of the head, chin, pubes, and axillæ; and the other, the softer hairs which either have no bulb, or at least a very minute one; and which are to be observed almost every where on the surface of the body.

(c) Describing this membrane as a common integument, it seems right to give it the name of *membrana adiposa*; for under the skin its cells are usually filled with fat; but the same membrane is found to invest the most minute fibres we are able to trace, and is called *cellular membrane* in some parts of the body where its cells are not filled with fat, and *reticular* in others, where it appears like very minute net-work.

(d) The two difcases which are peculiar to this membrane, are proofs of this communication; for in the emphysema, all its cells are filled with air; and in the anasarca, they are universally distended with water. Besides these proofs of this communication from difcase, a familiar instance of it may be observed amongst butchers, who usually puncture this membrane, and by inflating it with air add to the good appearance of their meat.

that purpose; for without this renewal it would probably become unfit for use. The great waste of it in many diseases, particularly in the consumption, seems to be a sufficient proof that this absorption takes place; and it probably affords considerable nourishment to the body; for in people who have long fasted, the fat has been observed to decrease very fast.

d, The fat is not confined to the skin alone, being met with every where in the interstices of muscles, in the omentum, about the kidneys, at the basis of the

heart, in the orbits, &c. and some anatomical writers (e) of eminence, have been induced to consider it as the universal connecting medium of every part of the body.

e, The ordinary uses of this oily humour seem to be, to afford moisture to all the parts with which it is connected; to facilitate the action of the muscles; to defend the body from the attrition of external subtilances; and lastly, to add to its beauty, by making it every where smooth and equal.

PART III. OF THE MUSCLES.

CHAP. I.

Of the Muscles in General.

83 a, THE muscles are the fleshy parts of the body, and may be considered as the means by which all its movements are performed.

b, They are distinguished by different names (r) which allude to the different dispositions of their fibres, to their situation, or their use. In some, the fibres are placed parallel to each other, in a straight direction, and form what is called a *rectilinear muscle*; in others, the fibres are placed obliquely with respect to the tendons, like the plume of a pen; these are stiled *penniform muscles*: and there are muscles whose fibres cross and intersect each other. There are likewise other distinctions, but to follow them minutely would lead us too far.

c, Anatomists usually distinguish in the generality of muscles, a body, or belly part, and two extremities. The belly of the muscle is composed of an infinite number of fleshy fibres, of a red colour, which every body will understand under the name of *flesh*. The extremities include the same number of fibres as the belly of the muscle; but they are more firmly united together, and degenerate into a firm, glistening, and insensible substance, of a white colour, called *tendon*; if it be round and slender; or *aponeurosis*, if expanded into a broad flat surface.

d, That extremity which is attached to the most fixed part, has been named the *head of the muscle*; and that end which is inserted into the moveable part, has been called the *tail*. But these are arbitrary terms, and custom only can be pleaded for their being retained; for the extremities of a muscle vary with the different situations of the body; and parts that in some motions are fixed, become moveable in others.

e, The muscles are not only surrounded by a very fine membrane, which envelops them separately; but the fibres of every muscle, upon a nice enquiry, are found to be divided into distinct fasciculi or bundles, and these divisions are probably subdivided ad infinitum.

f, Leuwenhoeck fancied he had discovered, by means of his microscope, the ultimate division of a muscle; and that he could point out the simple fibre, which appeared to him to be an hundred times less

than a hair; but he was afterwards convinced how much he was mistaken on this subject, and candidly acknowledged, that what he had taken for a simple fibre, was in fact a bundle of fibres.

g, It is easy to observe several of these fasciculi or bundles, in a piece of beef; in which, from the coarseness of its texture, they are very evident.

h, The muscles owe the red colour, which so particularly distinguishes their belly part, to an infinite number of blood-vessels, which are every where dispersed like net-work through their whole substance; for their fibres, after having been macerated in water, are, like all other parts of the body divested of their blood, found to be of a white colour. The blood-vessels are accompanied by nerves, and they are both distributed in such abundance to these parts, that in endeavouring to trace the course of the blood-vessels in a muscle, it would appear to be formed altogether by their ramifications; and in an attempt to follow the branches of its nerve, their number and minuteness would soon elude the eye and the knife of the anatomist; and the whole muscle would appear perhaps as if composed only of nerves.

i, We defined the muscles to be moving powers, and we are all sensible of the propriety of this definition; but nobody seems to understand perfectly how these powers are effected.

k, If a muscle is pricked or irritated, it contracts, and becomes firm and rigid. This is called its tonic action, or irritable principle.

l, If it is much distended or compressed, it endeavours to re-establish itself by its spring, like all elastic bodies.

m, But besides these two properties, it possesses a third, which is peculiar to it; and this is, that without having been either pricked or irritated, drawn out or distended, it shortens itself, or at least endeavours to shorten itself, at the command of the will. There are some muscles, however, which are called involuntary; because they act independent of the will, as the heart and muscles of respiration. The last of these may be said to have a mixed motion, being in some measure influenced by the will.

n, It is this action of the voluntary muscles which is called *muscular motion*; and of which we will endeavour to convey an idea in a few words. To illustrate

(e) Haller.

(f) Different authors have described the same muscle by different names. Many new Latin ones have lately been introduced by the celebrated Albinus with great seeming propriety; but such alterations are liable to create confusion. In France, Mr Winflow's method is universally followed, who distinguished all the muscles by French names, which are often very different from any Latin name before in use. All these variations are pointed out in the later editions of Douglas's Myography.

illustrate what we shall advance, it will be necessary to take a muscle or two as examples.

o. In the osteological part of the work, the generality of the bones were described as being articulated to each other with so much art, as to be capable of motion every way; but their motions cannot be performed by themselves, as they are perfectly passive in all the movements of the body. The muscles are a kind of cords attached to the bones, which they move in different directions by shortening their fibres. Every one is acquainted with the motion of the lower jaw: we are able first to lower it, and then to raise and apply it strongly against the upper jaw. The action of the masseter muscle, in this case is very sensible above. It is fixed to the os maxilæ, and part of the upper jaw; and below, it is attached to the lower and outer ridge of the under jaw. When we are willing then to raise the jaw, its muscles are put into action. The masseter on each side contracts; its fleshy part swells and enlarges, and becomes harder and shorter; and as the upper end of this muscle is attached to a fixed and immoveable part, which is the case with the maxilla superior, the lower extremity is necessarily drawn towards the upper one, bringing with it the lower jaw. This muscle, when in action, may be easily felt, by applying the hand to the cheek, between the cheek bone and the lower jaw.

p. Again, when we desire to bend the finger, the flexor muscles which are attached to the os humeri, and the bones of the fore arm, and have their moveable part fixed to the inner extremities of the fingers, contract and shorten themselves; and thus the ends of the fingers are drawn towards the palm of the hand.

q. It will here naturally be inquired by what mechanism this power to contract is occasioned. Many opinions have been formed, and much has been written on this subject. Some of these systems were the result of much industry and ingenuity, and required no

small share of mathematical knowledge not only to invent, but to understand them. Some have undertaken to explain the cause of contraction, by supposing that every muscular fibre forms as it were a chain of very minute bladders; while the nerves which are distributed through the muscle bring with them a supply of animal spirits, which at our will fill these bladders, and by increasing their diameter in width, shorten them, and of course the whole fibre. We will dwell no longer on this ingenious hypothesis, or say any thing of other systems, which as well as that we have mentioned, are far from being satisfactory; and we will only observe, that here, as in many other of her works, Nature seems to have drawn a boundary to our inquiries, beyond which no human penetration will probably ever extend.

q. Some few things we know with certainty on this subject, and these are, that the nerves are essentially necessary to muscular motion; for if we tie up or divide the nerves leading to any muscle, that muscle becomes paralytic and incapable of action; that the cause of palsy is usually not seated in the part affected, but commonly in the nerve leading to that part, and perhaps in the brain or spinal marrow, from whence the nerves originate; and that a ligature made on the artery leading to a muscle produces the same effects as a ligature on the nerve, by rendering it inactive, and even insensible; and this last observation seems to prove, that a regular supply of blood, if not the immediate cause of muscular motion, is at least essentially necessary to it.

As the enumeration and description of the particular muscles must be dry and unentertaining to the generality of readers, yet cannot be omitted in a work of this nature, it appeared eligible to throw this part of the subject into the form of a table, leaving the reader to examine or pass it over as he inclines.

A TABLE OF A

Parts of the Body.	Names of the Muscles.	ORIGIN.
Integuments of the cranium.	1. <i>Occipito-frontalis</i> . 2. <i>Corrugator supercilii</i> .	Ridge near the middle of the os occipitis. Internal angular process of the os frontis, above the joining of the os nasi with the superior maxillary
Ear-external.	1. <i>Attollens aurem</i> . 2. <i>Anterior auris</i> . 3. <i>Retrahentes auris</i> . 4. <i>Helicis major</i> . 5. <i>Helicis minor</i> . 6. <i>Tragus</i> . 7. <i>Antitragicus</i> . 8. <i>Transversus auris</i> .	Tendon of the occipito-frontalis where it covers the aponeurosis of the temporal muscle. Posterior part of the zygoma. By two or three small muscles from the mastoid process. Upper part of the helix. Inferior part of the helix. Middle and outer part of the concha. Internal part of the cartilage supporting the antitragus. Prominent part of the concha.
Ear-internal.	1. <i>Laxator tympani</i> . 2. <i>Tensor tympani</i> . 3. <i>Stapedius</i> .	Spinous process of the os sphenoides. Extremity of the eustachian tube, and spinous process of the os sphenoides. A little cavern in the pars petrosa near the mastoid process.
Eye-lids.	1. <i>Oricularis palpebrarum</i> . 2. <i>Levator palpebrae superioris</i> .	Orbital process of the superior maxillary bone. Foramen opticum of the os sphenoides.
Eye-balls.	1. <i>Levator oculi</i> . 2. <i>Depressor oculi</i> . 3. <i>Adductor oculi</i> . 4. <i>Abductor oculi</i> . 5. <i>Obliquus superior, seu trochlearis</i> . 6. <i>Obliquus inferior</i> . 7. <i>Compressor naris</i> . 1. <i>Levator anguli oris</i> .	Foramen opticum. Inferior part of the foramen opticum. Between the obliquus superior and depressor. Bony partition between the foramen opticum and laerum. Edge of the foramen opticum. Orbital process of the superior maxillary bone. Root of the ala nasi externally. Hollow of the superior maxillary bone, between the root of the socket of the first dens molaris and the foramen infraorbitarium.
Nose, Mouth and Lips.	1. <i>Levator labii superioris alaeque nasi</i> . 2. <i>Depressor labii superioris alaeque nasi</i> . 3. <i>Depressor anguli oris</i> . 4. <i>Depressor labii inferioris</i> . 5. <i>Levator labii inferioris</i> . 6. <i>Buccinator</i> . 7. <i>Zygomaticus major</i> . 8. <i>Zygomaticus minor</i> . 9. <i>Oricularis oris</i> .	Two portions. 1. Orbital process; 2. Nasal process of the superior maxillary bone. Os maxillare superius.
Lower-jaw.	1. <i>Temperalis</i> . 2. <i>Masseter</i> . 3. <i>Pterygideus internus</i> . 4. <i>Pterygideus externus</i> .	Lower edge of the maxilla inferior. Inferior part of the lower jaw. Lower jaw, at the root of the dens caninus and two dentes incisorii. Lower jaw, as far back as the last dens molaris. Os maxillare near the zygomatic future. Upper part of the os maxillare. Formed by the muscles that move the lips. Semicircular ridge of the parietal bone. Superior maxillary bone.
Anterior part of the neck.	1. <i>Platysma myoides</i> . 2. <i>Sternocleidomastoideus</i> .	Upper and internal part of the pterygoid process. Outside of the pterygoid, and root of the temporal process of the sphenoid bone from the adjacent tuberosity of the os maxillare.
Between the lower-jaw and os hyoides.	1. <i>Digastricus</i> . 2. <i>Mylo-hyoideus</i> . 3. <i>Genio-hyoideus</i> . 4. <i>Genio-glossus</i> . 5. <i>Hyo-glossus</i> . 6. <i>Lingualis</i> .	Cellular substance covering the upper parts of the deltoid and pectoral muscles. By two portions. 1. The top of the sternum. 2. The upper and anterior part of the clavicle.
Between the os hyoides and trunk.	1. <i>Sternohyoideus</i> . 2. <i>Omo-hyoideus</i> . 3. <i>Sternocleidomastoideus</i> . 4. <i>Hyo-thyroideus</i> . 5. <i>Cricohyoideus</i> .	Root of the mastoid process of the temporal bone. All the inside of the lower jaw. Internal protuberance in the middle of the lower jaw. The same with the former.
Between the lower jaw and os hyoides laterally.	1. <i>Stylo-glossus</i> . 2. <i>Stylo-hyoideus</i> . 3. <i>Stylo-pharyngeus</i> . 4. <i>Circumflexus, or Tensor palati</i> . 5. <i>Levator palati</i> .	Base, cornu, and appendix of the os hyoides. Root of the tongue laterally. Cartilaginous extremity of the first rib. Superior costa of the scapula. Whole edge of the uppermost bone of the sternum internally. Part of the basis and almost all the cornu of the os hyoides. Side and fore part of the cricoid cartilage. Styloid process, and a ligament connecting it with the lower jaw. Middle and inferior part of the styloid process.
Entry into the fauces.	1. <i>Constrictor isthmi faucium</i> . 2. <i>Palato-pharyngeus</i> . 3. <i>Azygos uvulae</i> .	Root of the styloid process. Spinous process of the os sphenoides, and eustachian tube. Extremity of the pars petrosa of the temporal bone, and membranous part of the eustachian tube.
About the glottis, and behind the larynx.	1. <i>Crico-arytenoideus posterior</i> . 2. <i>Crico-arytenoideus lateralis</i> . 3. <i>Arytenoideus obliquus</i> . 4. <i>Arytenoideus transversus</i> . 5. <i>Arytenoideus</i> . 6. <i>Thyro-epiglottideus</i> . 7. <i>Aryteno-epiglottideus</i> .	Back part of the cricoid cartilage. Cricoid cartilage, laterally, where it is covered by the thyroid. Base of one arytenoid cartilage, and crosses its fellow. Side of one arytenoid cartilage, its fibres running across. Posterior part of the thyroid cartilage laterally. Near the former.
Posterior part of the pharynx.	1. <i>Constrictor pharyngis superior</i> . 2. <i>Constrictor pharyngis medius</i> . 3. <i>Constrictor pharyngis inferior</i> .	Lateral and upper part of the arytenoid cartilage. Cuneiform process of the os occipitis; pterygoid process of the os sphenoides, and from the upper jaw. Appendix of the os hyoides, the cornu of the bone, and the ligament connecting it to the thyroid cartilage. Side of the thyroid cartilage, and from the cricoid cartilage.

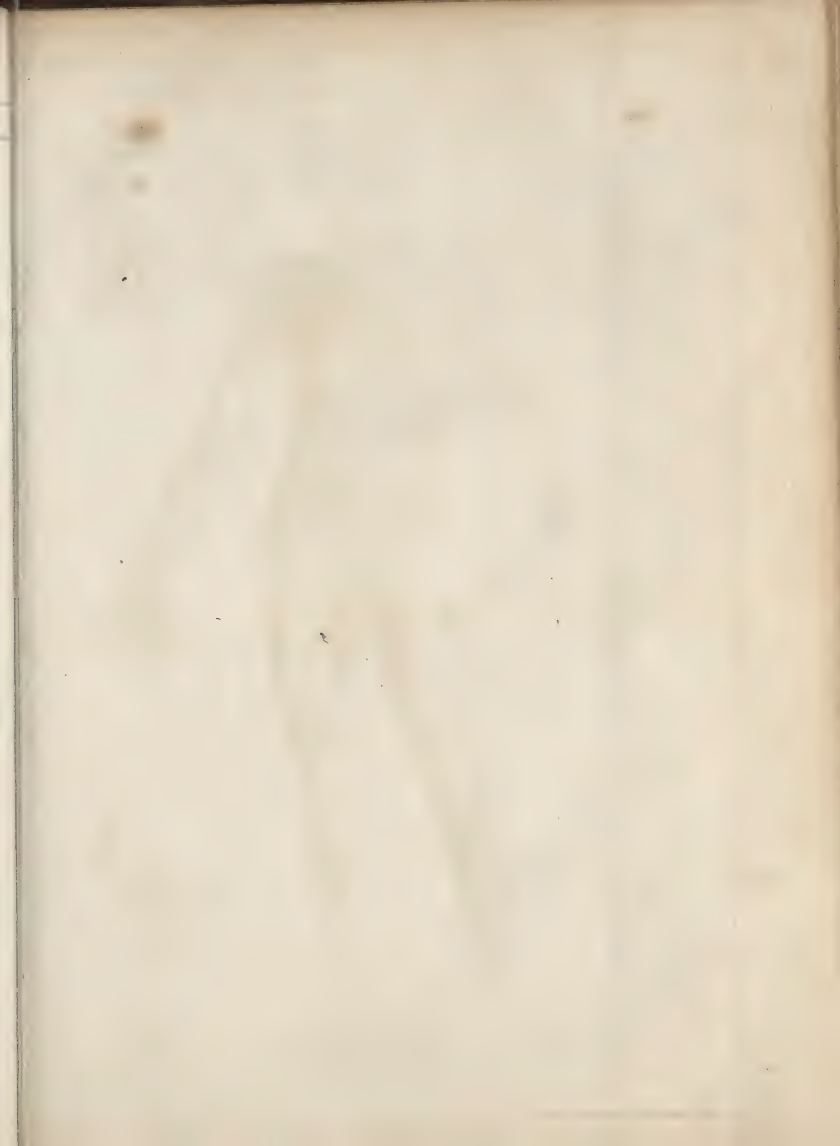
to m fo al ki in on ar it m is an of th on lar up me pe the m and ing an	bone.	Orbicularis palpebrarum, det Inner part of the occipito-frontal	Upper part of the ear opposite Eminence of the helix, opposite Back-ear, opposite to the larynx Cartilage of the helix. Crus of the helix. Point of the tragus. Tip of the antitragus. Opposite to the outside of the long process of the malleus. Small process of the malleus. Posterior part of the head of the Nafal process of the superior Cartilage called <i>tragus</i> , supports Upper and fore part of the tragus Opposite to the former. Opposite to the inner angle. Globe of the eye, opposite to the Tunica sclerotica. Tunica sclerotica. Anterior extremity of the os maxillare Angle of the mouth and under lip	Anterior part of the abdomen.	1. <i>Obliquus descendens externus.</i> 2. <i>Obliquus ascendens internus.</i> 3. <i>Transversalis.</i> 4. <i>Rectus abdominis.</i> 5. <i>Pyramidalis.</i> 1. <i>Darius.</i> 2. <i>Cremaster.</i> 3. <i>Erector penis.</i> 4. <i>Accelerator urinae, seu ejaculator penis.</i> 5. <i>Transversalis penis.</i> 1. <i>Sphincter ani.</i> 2. <i>Levator ani.</i> 1. <i>Erector clitoridis.</i> 2. <i>Sphincter vaginae.</i> 3. <i>Transversus perinaei.</i> 4. <i>Sphincter ani.</i> 5. <i>Levator ani.</i> 1. <i>Obturator internus.</i> 2. <i>Coccygus.</i> 1. <i>The superior, or greater muscle of the diaphragm.</i> 2. <i>The inferior, or lesser muscle of the diaphragm.</i> 3. <i>Quadratus lumborum.</i> 4. <i>Psoas parvus.</i> 5. <i>Psoas magnus.</i> 6. <i>Iliacus internus.</i> 1. <i>Pectoralis major.</i> 2. <i>Subclavius.</i> 3. <i>Pectoralis minor.</i> 4. <i>Serratus magnus.</i> 1. <i>Intercostales externi.</i> 2. <i>Intercostales interni.</i> 3. <i>Triangularis, or Sterno-costalis.</i> 1. <i>Longus colli.</i> 1. <i>Rectus capitis internus major.</i> 3. <i>Rectus capitis internus minor.</i> 4. <i>Rectus capitis lateralis.</i> 1. <i>Trapezius seu cucullaris.</i> 2. <i>Latissimus dorsi.</i> 3. <i>Serratus pectus inferior.</i> 4. <i>Rhomboidei.</i> } 1. <i>Major.</i>
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A TABLE OF THE MUSCLES.

INSERTION.

to that bone.	Inferior part of the tubercle of the tibia, and the upper part of its spine. Tibia, near the sartorius.
from almost all the in-	Upper part of the patella; and from the inferior part of this bone the tendon is sent off of the tibia. A large share of the upper part of the patella.
	Upper and inside of the patella.
	Upper part of the patella. Inside of the ridge of the tibia, a little below its tubercle.
	Superior and back part of the head of the tibia.
uraſpera.	Upper part of the head of the fibula.
tra little above the condyle.	Ridge at the upper and internal edge of the tibia.
posterior part of its middle.	Upper and posterior part of the os calcis, by the tendo Achillis.
	Inside of the posterior part of the os calcis.
to tibia, from near one half	Inside of the os cuneiforme internum, and posterior end of the metacarpal bone sustaining os naviculare, cuneiforme internum and medium; os calcis, cuboides, and the root of t bone sustaining the middle toe.
	Out side of the root of the metatarsal bone sustaining the great toe, and os cuneiforme i
from the tendinous fascia	Root and external part of the metatarsal bone sustaining the little toe. Root of the first joint of each of the small toes, and expanded over their upper side as far as
	Tendinous expansion covering the small toes, and that covering the upper part of the g Second phalanx of the four lesser toes.
	Extremity of the last joint of the four lesser toes.
the same bone.	Tendon of the flexor longus.
	Inside of the first joint of the four lesser toes. Posterior part of the first and last joint of the great toe. Last joint of the great toe. External os sesamoidæum, and root of the first joint of the great toe. The same with the former.
of the second toe.	External os sesamoidæum, and root of the metatarsal bone of the great toe.
toe.	Root of the first joint of the little toe externally. Anterior extremity of the metatarsal bone, and root of the first joint of the little toe.
from the metatarsal bone	Inside of the root of the first joint of the fore toe. Outside of the root of the first joint of the fore toe. Outside of the root of the first joint of the second toe. Outside of the root of the first joint of the third toe. Inside of the root of the first joint of the middle toe. Root of the first joint of the third toe. Root of the first joint of the little toe. Outside of the anterior extremity of the metatarsal bone of the little toe.

r			
t			
n	bone.	Orbicularis palpebra	To move the leg obliquely inwards, or to bring one leg and thigh cross the other.
f		Inner part of the os	To bend the thigh and leg inwards.
a		the tubercle	To extend the leg by means of the patella, like a pulley.
k			To extend the leg.
i		Upper part of the os	To extend the leg.
o		Eminence of the hel	To assist in the extension of the leg.
a		Back-car, opposite t	To bend the leg backwards and a little inwards.
it		Cartilage of the heli	To bend the leg and bring it directly backwards.
n		Crus of the helix.	To bend the leg.
is		Point of the tragus.	To move the leg obliquely outwards, and to assist in bending it.
a		Tip of the antitragu	
o		Opposite to the outfi	
ti		Long process of the	
ol		Small process of the	To extend the foot.
u		Posterior part of the	To assist the former.
m		Nasal process of the	To bend the foot.
pe		Cartilage called <i>tarso</i>	To bring the foot inwards and upwards.
th		Upper and fore part the great toe.	To move the foot outwards, and bend it a little.
m,	and	Opposite to the fornix metatarsal	To pull the foot outwards and upwards.
in		Opposite to the innu	To extend all the joints of the four small toes.
ar		Globe of the eye, <i>opternum</i> .	To extend the toes.
		Tunica sclerotica.	To bend the second joint of the toes.
		Tunica sclerotica. the last joint.	To bend the toes.
		Anterior extremity	To assist the the former.
		Angle of the mouth great toe.	To assist in bending the toes.
		1. Upper lip, and o	To extend the great toe.
		Upper lip, and root	To bend the last joint of the great toe.
		Angle of the mouth	To bend this first joint.
		Edge of the under l	To pull the great toe from the rest.
		Under lip and skin	To bring this toe nearer the rest.
		Angle of the mouth	To draw the little toe outwards.
		Angle of the mouth	To bend the little toe.
		Upper lip near the	To pull the fore toe inwards.
		Coronoid process of	To pull the fore toe outwards towards the rest.
		Angle of the lower	To pull the second toe outwards.
		Angle of the lower	To pull the third toe outwards.
		Condylloid process c	To pull the middle toe inwards.
			To pull the third toe inwards.
			To pull the little toe inwards.
			To bring the little toe towards the great one.
		Lower jaw, between	
		Mastoid process.	
		Anterior part of the	
		Lower edge of the l	
		Basis of the os hyoi	
		Tip, middle, and r	
		Side of the tongue	
		Tip of the tongue.	
		Base of the os hyoid	
		Base of the os hyoid	
		Rough line at the c	
		Rough line opposit	
		By two portions.	
		Root of the tongue	
		Os hyoides at the j	
		Side of the pharynx	
		Velum pendulum p	
	nbc.	Whole length of tl	
		Middle of the velu	
		Edge of the upper.	
		Tip of the uvula.	
		Posterior part of tl	
		Side of the base of	
		Tip of the other a	
		The other aryteno	
		Arytenoid cartilag	
		Epiglottis laterall	
		Epiglottis, along	
	under	White line in the	
	artilage.	Middle of the cur	
		White line in the	





EXPLANATION OF PLATE XV. AND XVI.

PLATE XV.

FIG. 1. The MUSCLES immediately under the common teguments on the anterior part of the body, are represented on the right side; and on the left side the MUSCLES are seen which come in view when the exterior ones are taken away.

A, The frontal muscle. B, The tendinous aponeurosis which joins it to the occipital; hence both named *occipito-frontalis*. C, Attollens aurem. D, The ear. E, Anterior auris. F F, Orbicularis palpebrarum. G, Levator labii superioris alæque nasi. H, Levator anguli oris. I, Zygomaticus minor. K, Zygomaticus major. L, Masseter. M, Orbicularis oris. N, Depressor labii inferioris. O, Depressor anguli oris. P, Buccinator. Q Q, Platysma myoides. R R, Sterno-cleido-mastoideus. S, Part of the trapezius. T, Part of the scaleni.

SUPERIOR EXTREMITY.—U, Deltoides. V, Pectoralis major. W, Part of the latissimus dorsi. X X, Biceps flexor cubiti. Y Y, Part of the brachialis externus. Z Z, The beginning of the tendinous aponeurosis, (from the biceps) which is spread over the muscles of the fore-arm. a a, Its strong tendon inserted into the tubercle of the radius. b b, Part of the brachialis internus. c, Pronator radii teres. d, Flexor carpi radialis. e, Part of the flexor carpi ulnaris. f, Palmaris longus. g, Aponeurosis palmaris. 3, Palmaris brevis. 1, Ligamentum carpi annulare. 2 2, Abductor minimi digiti. h, Supinator radii longus. i, The tendons of the thumb. k, Abductor pollicis. l, Flexor pollicis longus. m m, The tendons of the flexor sublimis perforatus, profundus perforans, and lumbricales.—The sheaths are entire in the right hand,—in the left cut open, to shew the tendons of the flexor profundus perforating the sublimis.

MUSCLES not referred to—in the left superior extremity.—n, Pectoralis minor, seu ferratus anticus minor. o, The two heads of (x x) the biceps. p, Coracobrachialis. q q, The long head of the triceps extensor cubiti. r r, Texes major. s s, Subscapularis. t t, Extensores radiales. u u, Supinator brevis. v, The cut extremity of the pronator teres. w, Flexor sublimis perforatus. x, Part of the flexor profundus. y, Flexor pollicis longus. z, Part of the flexor pollicis brevis. 4, Abductor minimi digiti. 5, The four lumbricales.

TRUNK.—6, Serrated extremities of the ferratus anticus major. 7 7, Obliquus externus abdominis. 8 8, The linea alba. 9, The umbilicus. 10, Pyramidalis. 11 11, The spermatic cord. On the left side, it is covered by the cremaster. 12 12, Rectus abdominis. 13, Obliquus internus. 14 14, &c. Intercoastal muscles.

INFERIOR EXTREMITIES.—a a, The gracilis. b b, Parts of the triceps. c c, Pectialis. d d, Psoas magnus. e e, Iliacus internus. f, Part of the glutæus medius. g, Part of the glutæus minimus. h, Cut extremity of the rectus cruris. i i, Vastus externus. k, Tendon of the rectus cruris. l l, Vastus internus. * Sartorius muscle. ** Fleishy origin of the tensor vaginæ femoris or membranofus. Its tendinous aponeurosis covers (i), the vastus externus in the right-side. m m, Patella. n n, Ligament or tendon from it to the tibia. o, Rectus cruris. p, Cruræus. q q, The tibia. r r, Part of the gemellus or gastrocnemius externus. s s s, Part of the soleus or gastrocnemius internus. t, Tibialis anticus. u, Tibialis posticus. v v, Peronæi muscles. w w, Extensor longus digitorum pedis. x x, Extensor longus pollicis pedis. y, Abductor pollicis pedis.

FIG. 2. The MUSCLES, GLANDS, &c. of the left side of the face and neck, after the common teguments and platysma myoides have been taken off.

a, The frontal muscle. b, Temporalis and temporal artery. c, Orbicularis palpebrarum. d, Levator labii superioris alæque nasi. e, Levator anguli oris. f, Zygomaticus. g, Depressor labii inferioris. h, Depressor anguli oris. i, Buccinator. k, Masseter. l l, Parotid gland. m, Its duct. n, Sterno-cleido-mastoideus. o, Part of the trapezius. p, Sterno-hyoidæus. q, Sterno-thyroïdæus. r, Omo-hyoidæus. s, Levator scapulæ. t t, Scaleni. u, Part of the splenius.

FIG. 3. The MUSCLES of the face and neck, in view after the exterior ones are taken away.

a a, Corrugator supercilii. b, Temporalis. c, Tendon of the levator palpebræ superioris. d, Tendon of the orbicularis palpebrarum. e, Masseter. f, Buccinator. g, Levator anguli oris. h, Depressor labii superioris alæque nasi. i, Orbicularis oris. k, Depressor anguli oris. l, Muscles of the os hyoides. m, Sterno-cleido-mastoideus.

FIG. 4. Some of the MUSCLES of the os hyoides, and submaxillary gland.

a, Part of the masseter muscle. b, Posterior head of the digastric. c, Its anterior head. d d, Sterno-hyoidæus. e, Omo-hyoidæus. f, Stylo-hyoidæus. g, Submaxillary gland in situ.

FIG. 5. The submaxillary gland and duct. a, Musculus mylo-hyoidæus. b, Hyo-glossus. c, submaxillary gland extra situ. d, Its duct.

PLATE XVI.

FIG. 1. The MUSCLES immediately under the common teguments on the posterior part of the body are represented in the right side; and on the left side the MUSCLES are seen which come in view when the exterior ones are taken away.

HEAD.—A A, Occipito-frontalis. B, Attollens aurem. C, Part of the orbicularis palpebrarum. D, Masseter. E, Pterygoidæus internus.

TRUNK.—Right side. F F F, Trapezius seu cucularis. G G G G, Latissimus dorsi. H, Part of the obliquus externus abdominis.

TRUNK.—Left side. I, Splenius. K, Part of the complexus. L, Levator scapulæ. M, Rhomboides. N N, Serratus posticus inferior. O, Part of the longissimus dorsi. P, Part of the sacro-lumbalis. Q, Part of the semi-spinalis dorsi. R, Part of the serratus anticus major. S, Part of the obliquus internus abdominis.

SUPERIOR EXTREMITY.—Right side. T, Deltoides. Z z, U,

U, Triceps extensor cubiti. V, Supinator longus. W W, Extensores carpi radialis longior et brevior. X X, Extensor carpi ulnaris. Y Y, Extensor digitorum communis. Z, Abductor indicis. 1 2 3, Extensores pollicis.

SUPERIOR EXTREMITY.—Left side. a, Supra spinatus. b, Infra-spinatus. c, Teres minor. d, Teres major. e, Triceps extensor cubiti. f f, Extensores carpi radiales. g, Supinator brevis. h, Indicator. 1 2 3, Extensores pollicis. i, Abductor minimi digiti. k, Interossei.

INFERIOR EXTREMITY.—Right side. l, Gluteus maximus. m, Part of the gluteus medius. n, Tensor vaginae femoris. o, Gracilis. p p, Adductor femoris magnus. q, Part of the vastus internus. r, Semimembranosus. s, Semitendinosus. t, Long head of the biceps flexor cruris. u u, Gastrocnemius externus seu gemellus. v, Tendo Achillis. w, Soleus seu gastrocnemius internus. x x, Peronæus longus et brevis. y, Tendons of the flexor longus digitorum pedis;—and under them * flexor brevis digitorum pedis. z, Abductor minimi digiti pedis.

INFERIOR EXTREMITY.—Left side. m, n, o, p p, q, r, s, t, v, w w, x x, y, z. Point the same parts as in the right side. a, Pyriformis. b b, Gemini. c c, Obturator internus. d, Quadratus femoris. e, Coccygæus. f, The short head of the biceps flexor cruris. g g, Plantaris. h, Popliteus. i, Flexor longus pollicis pedis.

FIG. 2. The palm of the left hand after the common teguments are removed, to shew the MUSCLES of

the fingers.

a, Tendon of the flexor carpi radialis. b, Tendon of the flexor carpi ulnaris. c, Tendons of the flexor sublimis perforatus, profundus perforans and lumbricales. d, Abductor pollicis. e e, Flexor pollicis longus. f, Flexor pollicis brevis. g, Palmaris brevis. h, Abductor minimi digiti. i, Ligamentum carpiannulare. k, A probe put under the tendons of the flexor digitorum sublimis; which are perforated by l, the flexor digitorum profundus. m m m, Lumbricales. n, Adductor pollicis.

FIG. 3. A fore-view of the foot and tendons of the flexores digitorum.

a, Cut extremity of the tendo Achillis. b, Upper part of the astragalus. c, Os calcis. d, Tendon of the tibialis anticus. e, Tendon of the extensor pollicis longus. f, Tendon of the peronæus brevis. g, Tendons of the flexor digitorum longus, with the nonus Vesalii. h h, The whole of the flexor digitorum brevis.

FIG. 4. MUSCLES of the Anus.

a a, An outline of the buttocks, and upper part of the thighs. b, The testes contained in the scrotum. c c, Sphincter ani. d, Anus. e, Levator ani. f f, Erector penis. g g, Accelerator urinæ. h, Corpus cavernosum urethrae.

FIG. 5. MUSCLES of the Penis.

a a, b, d, e, c, f f, h, point the same as in fig. 4. c, Sphincter ani. g g, Transversalis penis.

PART IV. OF THE ABDOMEN, OR LOWER BELLY.

a, **THE** abdomen, or lower belly, extends from the lower extremity of the sternum, or the hollow usually called the *pit of the stomach*, and more properly *scoribulus cordis*, to the lower part of the trunk.

b, It is distinguished into three divisions, called *regions*: of these the superior one, which is called the *epigastric region*, begins immediately under the sternum, and extends to within two finger's-breadth of the navel, where the middle or *umbilical region* begins, and reaches to the same distance below the navel. The third, which is called the *hypogastric*, includes the rest of the abdomen, as far as the os pubis.

c, Each of these regions is subdivided into three parts; two of which compose the sides, and the other the middle part of each region.

d, The middle part of the upper region is called *epigastrium*; and its two sides *hypochondria*. The middle part of the next region is the *umbilical region*, properly so called, (o) and its two sides are the flanks, or iliac regions. Lastly, the middle part of the lower region retains the name of *hypogastrium*, and its sides are called *inguina* or *groins*. The back part of the abdomen bears the name of *lumbæ region*.

e, These are the divisions of the lower belly, which are necessary to be held in remembrance as they frequently occur in chirurgical and anatomical writing. We will now proceed to examine the contents of the abdomen, and after having pointed out the name and ar-

range of the several viscera contained in it, describe each of them separately.

f, After having removed the skin, adipose membrane, and abdominal muscles, of which there are five on each side, we discover the peritonæum; for so the membrane is called which envelops all the viscera of the lower belly. This being opened, the first part that presents itself is, the omentum or cawl, floating on the surface of the intestines; which are likewise seen every where loose and moist, and making a great number of circulations through the whole cavity of the abdomen. The stomach is placed in the epigastrium, and under the stomach is the pancreas. The liver fills the right hypochondrium, and the spleen is situated in the left. The kidneys are seen about the middle of the lumbar region, and the urinary bladder and parts of generation are seated in the lower division of the belly.

CHAP. I.

Of the PERITONÆUM.

350

a, **THE** peritonæum is a strong, simple membrane, by which all the viscera of the abdomen are surrounded, and in some measure supported. Many anatomical writers have described it as being composed of two distinct membranous laminae; but their descriptions seem to be erroneous. What perhaps appeared to be a second lamina, being found to be simply a cellular coat; which sends off productions to the blood vessels passing out.

(o) The navel is formed by the extremities of the vessels which keep up a communication between the mother and the fetus in utero. As soon as the child comes into the world, these vessels are divided and secured by ligature, their cavities disappear, and in progress of time they become a ligamentous cord.

Fig. 2.



Fig. 1.



Fig. 3.



Fig. 4.

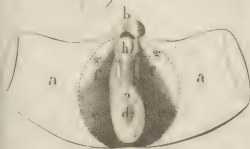


Fig. 5.





out of the abdominal cavity. The aorta, and vena cava, likewise, derive a covering from the same membrane; which seems to be a part of the cellular membrane we have already described.

b, The peritonæum, by its productions and reduplications, envelops the greatest part of the abdominal viscera. It is soft, and capable of considerable extension, and is kept smooth and moist by a vapour which is constantly exhaling from its inner surface, and is returned again into the circulation by the absorbents.

c, This moisture not only contributes to the softness of the peritonæum, but prevents the attrition, and other ill effects which would otherwise probably be occasioned by the motion of the viscera upon each other.

d, When this fluid is supplied in too great a quantity, or the absorbents become incapable of carrying it off, it accumulates; and constitutes an ascites or dropsy of the belly; and when by any means the exhalation is discontinued, the peritonæum thickens; becomes diseased; and the viscera are sometimes found adhering to each other.

e, It is supplied with blood by branches of the mammary, epigastric, and phrenic arteries; and the blood is carried back by veins of the same name. Its nerves are derived from the spinal marrow of the lumbar vertebrae, and os sacrum; being branches of the nerves distributed to the abdominal muscles, and it likewise receives some branches from the nerves which go to the diaphragm.

С H A P. II.

Of the OMENTUM.

351

a, THE omentum or cawl is a most delicate double membrane, interlarded with a great deal of fat, which is attached to the stomach, spleen, duodenum, and colon; and from thence hangs down loose and floating on the surface of the intestines. Sometimes it descends as low as the groin, and in people who are subject to ruptures, it is now and then found to pass through the abdominal rings, and distend the hernial sac. The disease is then called *epiplocele*, for the Greeks gave the name of *epiploon*, to this viscus. The omentum, by being double, forms a kind of pouch open only at one end, and some French writers have on this account compared it to a *cul de sac*. The celebrated M. Winslow has demonstrated this aperture, which is situated under the great lobe of the liver near the beginning of the lesser lobe; and the whole pouch may be distended by blowing air in at this opening (n).

b, The celiac and mesenteric arteries send off branches to the omentum, and its redundant blood passes into the branches of the vena porta.

c, The use of this viscus is not perfectly known. It has been supposed, with great appearance of probability, to contribute to the warmth and moisture of the other viscera; for adhesions have been observed to have taken place where the fat of the omentum has been much wasted. But there are authors who consider it as assisting in the preparation of bile; and Malpighi has remarked, that in warming the part which in frogs

supplies the place of omentum, the fat was seen to dissolve into spherical drops, which passed into the vena porta.

C H A P. III.

Of the STOMACH.

352

a, THE stomach is a membranous and muscular bag, in shape not unlike a bag-pipe, lying across the upper part of the abdomen, and inclining rather more to the left than the right side.

b, It has two orifices, one of which receives the end of the œsophagus, and is called the *cardia*; and sometimes the left and upper orifice of the stomach; though its situation is not much higher than the other, which is styled the right and inferior orifice, and more commonly the *pylorus*; both these openings are more elevated than the body of the stomach.

c, The aliment passes down the œsophagus into the stomach through the cardia, and after having undergone the necessary digestion, passes out at the pylorus where the intestinal canal commences.

d, The stomach is composed of four tunics or coats, which are so intimately connected together, that it requires no little dexterity in the anatomist to demonstrate them. The exterior one is membranous, being derived from the peritonæum. The second is a muscular tunic, composed of fleshy fibres which are in the greatest number about the two orifices. The third is called the nervous coat, and within this is the villous or velvet-like coat, which composes the inside of the stomach.

e, The two last coats being more extensive than the two first, form the folds which are observed every where in the cavity of this viscus; and more particularly about the pylorus, where they seem to impede the two hasty exclusion of the aliment, making a considerable plait, called *valvula pylori*.

f, The inner coat is constantly moistened by a mucus which approaches to the nature of the saliva, and is called the *gastric juice*; this liquor is supposed to be secreted by certain minute glands (1) seated in the nervous tunic, whose excretory ducts open on the surface of the villous coat.

g, The arteries of the stomach called the *gastric arteries*, are derived from the celiac; some of its veins pass to the splenic, and others to the vena porta; and its nerves are chiefly from the eighth pair or par vagum.

h, The account given of the tunics of the stomach may be applied to the whole alimentary canal; for both the œsophagus and intestines are, like this viscus, composed of four coats.

i, Before we describe the course of the aliment and the uses of the stomach, it will be necessary to speak of other parts which assist in the process of digestion.

C H A P. IV.

Of the OESOPHAGUS.

353

a, THE œsophagus or gullet, is a membranous and muscular canal extending from the bottom of the mouth

Z z z to

(n) This membranous bag, though exceedingly thin and transparent, is found capable of supporting mercury thrown into it by the same channel.

(1) Heister speaking of these glands very properly says, "in *porcis* facile, in *hominie* raro observantur," for altho' many anatomical writers have described their appearance and figure, yet they do not seem to have been hitherto satisfactorily demonstrated in the human stomach.

to the upper orifice of the stomach. Its upper part where the aliment is received, is shaped somewhat like a funnel, and is called the *pharynx*.

b, From hence it passes down close to the bodies of the vertebrae as far as the diaphragm, where there is an opening through which it passes; and then terminates in the stomach about the eleventh or twelfth vertebra of the back.

c, The œsophagus is supplied with blood vessels from the carotid arteries, and from the aorta; and receives other branches from the intercostal and cœliac arteries. The blood is returned from these vessels into the jugular veins, and the azygos.

d, Its nerves are derived from the eighth pair.

e, We likewise meet with a mucus in the œsophagus which every where lubricates its inner surface, and tends to assist in deglutition. This mucus seems to be secreted by very minute glands, like the mucus in other parts of the alimentary canal.

CHAP. V.

Of the INTESTINES.

a, THE intestines form a canal which is usually six times longer than the body to which it belongs. This canal extends from the pylorus or inferior orifice of the stomach, to the anus.

b, It will be easily understood, that a part of so great length must necessarily make many circulations to be confined with so many other viscera in the capacity of the lower belly.

c, Although the intestines are in fact, as we have observed, only one long and extensive canal; yet different parts have been distinguished by different names.

d, The intestines are first distinguished into two parts, one of which begins at the stomach and is called the *thin* or *small intestine*, from the small size of the canal, and the thickness of its coats when compared with the other part, which is called the *large intestine*; and includes the lower portion of the canal down to the anus.

e, Each of these parts has its subdivisions. The small intestines being distinguished into duodenum, jejunum, and ileum; and the larger portion into cæcum, colon, and rectum.

f, The small intestines fill the middle and fore-parts of the belly, while the large intestines fill the sides and both the upper and lower parts of the cavity.

g, The *duodenum*, which is the first of the small intestines, is so called, because it is about twelve inches long. It begins at the pylorus, and terminates in the *jejunum*; which is a part of the canal observed to be usually more empty than the other intestines; this appearance gives it its name, and likewise serves to point out where it begins.

h, The next division is the *ileum*, which of itself exceeds the united length of the duodenum and jejunum; and has received its name from its situation in the lower part of the umbilical region, near the ossa innominata. The large circvolution of the ileum covers the first of the large intestines called the *cæcum*, which seems properly to belong to the colon; being a kind of pouch about as wide as four fingers, and nearly of the same

length; having exteriorly a little appendix, called *appendix cæci*.

i, The cæcum is placed in the cavity of the os ilium on the right side, and terminates in the *colon*, which is the largest of all the intestines.

k, This intestine ascends by the right kidney to which it is attached, passes under the hollow part of the liver, and the bottom of the stomach to the spleen to which it is likewise secured, as it is also to the left kidney; and from hence passes down towards the os sacrum, where from its straight course the canal begins to take the name of *rectum*.

l, There are three ligamentous bands extending thro' the whole length of the colon, which by being shorter than its two inner coats, serve to increase the plaits on the inner surface of this gut.

m, The anus which terminates the intestinum rectum, is furnished with three muscles; one of these is composed of circular fibres, and from its use in shutting the passage of the anus, is called *sphincter ani*.

n, The other two are the *levator ani*; so called, because they elevate the anus after defecation. When these pass by, or any other disease, lose the power of contracting, the anus prolapses; and when the sphincter is affected by similar causes, the feces are voided involuntarily.

o, It has already been observed, that the intestinal canal is composed of four tunics; but it remains to be remarked, that here, as in the stomach, the two inner tunics being more extensive than the other two, form the plaits which are to be seen in the inner surface of the intestines, and are called *valvule conniventes*.

p, Some authors have considered these plaits as tending to retard the motion of the feces, so as to afford more time for the separation of the chyle; but there are others who attribute to them a different use: They contend that these valves, by being naturally inclined downwards, cannot impede the descent of the feces; but that they are intended to prevent their return upwards.

q, They are probably destined for both these uses; for altho' these folds incline to their lower side, yet the inequalities they occasion in the canal are sufficient to retard in some measure the progressive motion of the feces, and to afford a greater surface for the absorption of chyle; and their natural position seems to oppose itself to the return of the aliment.

r, Besides the *valvula conniventes*, there is one more considerable than the rest, called the *valve of the colon*; which is found at that part of the canal where the intestinum ileum is joined to the colon. This valve permits the alimentary pulp to pass downwards, but serves to prevent its return upwards; and it is by this valve that glysters are prevented from passing into the small intestines (κ).

f, Of the little vermiform appendix of the cæcum, it will be sufficient to say that its uses have never yet been ascertained. In birds we meet with two of these appendices.

t, The intestines are lubricated by a constant supply of mucus, formerly believed to be secreted by very minute glands, but now generally supposed to be exhaled from

(κ) This, however, is not invariably the case; for the contents of a glyster have been found not only to reach the small intestines, but to be voided at the mouth. Such instances however are not common.

from the minute ends of arteries. This mucus promotes the descent of the alimentary pulp, and, in some measure, defends the inner surface of the intestines from the irritation, to which it would perhaps otherwise be continually exposed, from the aliment; and which, when in a certain degree, excites a painful disorder called *colic*, a name given to the disease, because its most usual seat is in the intestinum colon.

u, The intestines are likewise frequently distended with air, and this distension sometimes occasions pain, and constitutes the flatulent colic.

v, The arteries of the intestines are continuations of the mesenteric arteries, which are derived in two considerable branches from the aorta. The redundant blood is carried back into the vena portarum.

w, In the rectum the veins are called *hemorrhoidal*; and are there distinguished into internal and external: The first are branches of the inferior mesenteric vein, but the latter pass into other veins. Sometimes these veins are distended with blood from obstructions, from weakness of their coats, or from other causes; and what we call the *hemorrhoid*, takes place. In this disease they are sometimes ruptured, and the discharge of blood which consequently follows, has probably occasioned them to be called *hemorrhoidal* veins.

x, The nerves of the intestines are derived from the eighth pair.

CHAP. VI.

Of the MESENTERY.

355

a, THE name of the mesentery implies its situation amidst the intestines. It is in fact a part of the peritoneum; being a reduplication (L) of that membrane from each side of the lumbar vertebrae to which it is firmly attached; so that it is formed of two laminae, connected to each other by cellular membrane.

b, The intestines in their different circulations form a great number of arches, and the mesentery accompanies them through all these turns; but by being attached only to the hollow part of each arch, it is found to have only a third of the extent of the intestines.

c, That part of this membrane which accompanies the small intestines is the *mesentery*, properly so called; but those parts of it which are attached to the colon and rectum, are distinguished by the names of *meso-colon*, and *meso-rectum*.

d, There are many glands dispersed thro' this double membrane, through which the lacteals and lymphatics pass in their way to the thoracic duct. The blood vessels of the mesentery were described in speaking of the intestines.

e, This membrane, by its attachment to the vertebrae, serves to keep the intestines in their natural situation. The idea usually formed of the colic called *mi-*

serere, is perfectly erroneous; it being impossible that the intestines can be twisted, as many suppose they are, in that disease, their attachment to the mesentery effectually preventing such an accident; but a disarrangement sometimes takes place in the intestinal canal itself, which is productive of disagreeable and sometimes fatal consequences. This is by an intussusception of the intestine; an idea of which may be easily formed by taking the finger of a glove, and involving one part of it within the other.

f, If inflammation takes place, the stricture in this case is increased; and the peristaltic motion of the intestines (by which is meant the progressive motion of the faeces downwards) is inverted, and what is called the *iliac passion* takes place. The same effects may be occasioned by a descent of the intestine, or of the omentum either with it or by itself; and thus constituting what is called a *hernia* or *rupture*, a term by which in general is meant the falling down or protrusion of any part of the intestine, or omentum, which ought naturally to be contained within the cavity of the belly.

g, To convey an idea of the manner in which such a descent takes place, it will be necessary to observe, that the lower edge of the tendon of the *musculus obliquus ascendens* is stretched from the fore-part of the os ilium or haunch bone, to the os pubis; and constitutes what is called *Poupart's*, or *Fallopian's* ligament; forming an opening, through which pass the great crural artery and vein. Near the os pubis the same tendinous fibres are separated from each other, and form an opening on each side, called the *abdominal rings*, through which the spermatic vessels pass in men, and the ligamenta uteri in women. In consequence of violent efforts, or perhaps of natural causes, the intestines are found sometimes to pass through these openings; but the peritoneum which incloses them when in their natural cavity, still continues to surround them even in their descent. This membrane does not become torn or lacerated by the violence, as might be easily imagined, but its dilatability enables it to pass out with the viscera, which it incloses as it were in a bag, and thus forms what is called the *hernial sac*.

h, If the hernia be under Poupart's ligament, it is called *femoral*; if in the groin, *inguinal*; (M) and *scrotal* if in the scrotum: different names are likewise given to the hernia, as the contents of the *sac* differ, whether of omentum only, or intestine, or both; but these definitions more properly belong to the province of surgery.

CHAP. VII.

Of the PANCREAS.

356

a, THE pancreas is one of those glands which anatomists have agreed to call *conglomerate*; because they are composed of an infinite number of single or conglomerate

(L) He who only reads of the reduplication of membranes, will perhaps not easily understand how the peritoneum and pleura are reflected over the viscera in their several cavities; for one of these serves the same purposes in the thorax, that the other does in the abdomen. This disposition, for the discovery of which we are indebted to modern anatomists, seems now to be satisfactorily ascertained, and constitutes a curious part of anatomical knowledge: but the student, unaided by experience, and assisted only by what the limits of this treatise would permit us to lay on the occasion, would probably imbibed only confused ideas of the matter; and it will perfectly answer the present purpose, if he considers the mesentery as a membrane attached by one of its sides to the lumbar vertebrae; and by the other, to the intestines.

(M) The *hernia congenita* will be described with the male organs of generation; with which it is intimately connected.

bate glands collected together.

b, It is placed behind the bottom of the stomach, towards the first vertebra of the loins; being shaped like a dog's tongue, with its point stretched out towards the spleen, and its other end extending towards the duodenum. It is about eight fingers breadth in length, two or three in width, and one in thickness.

c, This viscus, which is of a yellowish colour, somewhat inclined to red, is covered with a membrane which it derives from the peritonæum. Its arteries, which are rather numerous than large, are branches of the *splenic*; and its veins pass into the veins of the same name; its nerves are derived from the intercostal.

d, The many little glands which it has been observed the pancreas is composed, all serve to secrete a liquor called the *pancreatic juice*; which in its colour, consistence, and other properties, does not seem to differ from the saliva. Each of these glands sends out a little excretory duct, which uniting with others, helps to form larger ducts; and all these at last terminate in one common excretory duct, first discovered by Virgungus, in 1642, which runs through the middle of the gland, and is now usually called *Ductus Pancreaticus Virgungii*. This canal opens into the intestinum duodenum, sometimes by the same orifice with the biliary duct, and sometimes by a distinct opening; the liquor it discharges being of a mild and insipid nature, serves to dilute the alimentary pulp, and to incorporate it more easily with the bile.

CHAP. VIII.

Of the LIVER.

a, The liver is a viscus of considerable size, and of a reddish colour; convex above, and in the forefront where it is placed under the ribs and diaphragm, and of an unequal surface behind. It is chiefly situated in the right hypochondrium, and under the false ribs; but it likewise extends into the epigastric region, where it borders upon the stomach. It is covered by a production of the peritonæum, which serves to attach it by three of its reduplications to the false ribs: these reduplications are called *ligaments*, though very different in their texture from what are called by the same name in other parts of the body. The umbilical cord too, which in the fœtus is pervious, gradually becomes a simple ligament after birth, and by passing to the liver, serves likewise to secure it in its situation.

b, At the posterior part of this organ where the umbilical vessels enter, it is found divided into two lobes; of these, the largest is placed in the right hypochondrium; the other, which covers part of the stomach, is called the *little lobe*. All the vessels which go to the liver pass in at the fissure we have mentioned, and the production of the peritonæum, which invests the liver, accompanies them in their passage and surrounds them like a glove. The credit of this discovery is due to an English anatomist, in honour of whom, this membranous production is now universally known by the name of *Gliſſon's capsula*.

c, The liver was considered by the ancients as an organ destined to prepare and perfect the blood, but later discoveries have proved that this opinion was wrong; and that the liver is a glandular substance formed for the secretion of the bile.

d, The blood is conveyed to the liver by the hepatic artery and the vena porta. This is contrary to the mode of circulation in other parts, where veins only serve to carry off the redundant blood; but, in this viscus, the hepatic artery, which is derived from the celiac, is wholly destined for its nourishment; and the vena porta, which is formed by the union of the veins from all the principal abdominal viscera, only furnishes the blood from which the bile is to be separated; so that these two series of vessels serve very distinct purposes. The vena porta as it is ramified through the liver, performs the office both of an artery and a vein; for it not only carries blood to the liver, but after having deposited its bile, brings back not only its own redundant blood, but likewise that of the hepatic artery into the vena cava.

e, The nerves of the liver are branches of the intercostal and par vagum. The bile after being separated from the mass of blood, in a manner of which mention will be made in another place, is conveyed out of this organ by very minute excretory ducts called *pori biliarii*; these uniting together like the excretory ducts in the pancreas, gradually form larger ones; which at length terminate in a considerable channel called *ductus hepaticus*.

CHAP. IX.

Of the GALL BLADDER, its contents and office.

a, The gall bladder is a little membranous bag, shaped like a pear, and attached to the posterior and almost inferior part of the great lobe of the liver.

b, It has three tunics, of which the exterior one is a production of the peritonæum; in the second there are muscular fibres, and the interior coat which is called the *nervous tunic*, forms several wrinkles on its inner surface, which is supplied with a mucus serving to defend it from the acrimony of the bile.

c, The gall bladder is supplied with blood vessels from the hepatic arteries; these branches are called the *cystic arteries*, and the *cystic veins* carry back the blood.

d, Its nerves are derived from the same origin as those of the liver.

e, The neck of the gall bladder is continued in the form of a canal called the *ductus cysticus*; which soon unites with the *ductus hepaticus* we described as the excretory duct of the liver, and forming one common canal takes the name of *ductus choledochus communis*; through which both the cystic and hepatic bile are discharged into the duodenum: this canal opens into the intestine in an oblique direction, first passing thro' the exterior tunic, and then piercing the other coats after running between each of them a very little way; this œconomy serves two useful purposes, to promote the discharge of bile, and to prevent its return.

a, The bile may be defined to be a natural liquid soap, somewhat fat and bitter, and of a yellowish colour. It easily mixes with water, oil and vinous spirits, and is capable of dissolving resinous substances. Its chemical analysis affords much animal oil, some volatile alkali, and a considerable quantity of water.

b, Its definition seems sufficiently to point out the

uses for which it is intended (x). It blends the alimentary mass by dividing and attenuating it; corrects the too great disposition to acceſſency which the aliment acquires in the ſtomach, and finally by its acrimony, tends to excite the perſiſtaltic motion of the inteſtines.

c, After what has been ſaid, it will be eaſily conceived that there are two ſorts of bile; one of which is derived immediately from the liver thro' the hepatic duct, and the other from the gall bladder. Theſe two biles do not eſſentially differ from each other. The hepatic bile, however, is milder and more liquid than the gall, which is conſtantly thicker and yellower; and by being more bitter, ſeems to poſſeſs greater activity than the other.

d, It is generally known that the *hepatic bile* is ſecreted from the maſs of blood by the liver; but the origin of the *cystic bile* has occaſioned no little controverſy amongst anatomical writers. There are ſome who contend that it is ſeparated in the ſubſtance of the liver, from whence it paſſes into the gall bladder thro' particular veſſels (o).

e, There are others who ſuppoſe it is ſecreted by certain veſſels in the bladder itſelf; and there are ſome writers who conſider the gall bladder ſimply as a reſervoir of hepatic bile, which not being perhaps at all times permitted to paſs into the inteſtine, flows back into the *cystic duct*; and that the difference in the colour, conſiſtence, and taſte of the bile, is merely the reſult of ſtagnation, increaſing in proportion to the length of time it has remained in the reſervoir. Again, their are other anatomists who ſuppoſe that the bile may be conveyed into the gall bladder by all theſe means.

f, We will not here relate all the arguments that have been advanced in favour of theſe ſeveral opinions, nor will we aim at eſtabliſhing any one of them in particular.

g, From whatever ſource the *cystic bile* is derived, it ſeems to be certain, that the gall bladder is a reſervoir in which it is collected, and where it gradually thickens. When the ſtomach is diſtended with aliment, this reſervoir undergoes a certain degree of compreſſion, and the bile paſſes out into the inteſtinal canal; and in the efforts to vomit, the gall bladder ſeems to be conſtantly affected, and at ſuch times diſcharges itſelf of its contents.

h, Sometimes the bile concretes in the gall bladder ſo as to form what are called *gall ſtones* (p); and when theſe concretions paſs into the *cystic duct*, they ſometimes occaſion exquiſite pain, by diſtending the canal in their way to the duodenum; and they frequently produce a temporary jaundice by lodging in the *ductus choledochus communis*, and preventing the bile from flowing into the inteſtine; but the jaundice is thought to be moſt uſually produced by obſtructions in the liver itſelf, which by preventing the ſeparation of bile from the blood, tend to give that univerſal yellowneſs to the body which is the characteristic of the diſeaſe.

CHAP. X.

Of the SPLEEN.

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a, The ſpleen is a ſoft and ſpongy viſcus, of a bluifh colour, about five or ſix fingers breadth in length, and three in width; ſituated in the left hypochondrium, between the ſtomach and the falſe ribs. That ſide of it which is placed on the ſide of the ribs, is convex; and the other which is turned towards the ſtomach, is concave.

b, The ſplenic artery, which is a branch from the *cœliac*, ſupplies this viſcus with blood, and a vein of the ſame name carries it back into the *vena porta*.

c, Its nerves are derived from a particular plexus called the *ſplenic*, which is formed by branches of the intercoſtal nerve, and by the eight pair or *par vagum*.

d, The uſes of the ſpleen have never yet been ſatisfactorily aſcertained.

e, The ancients, who ſuppoſed two ſorts of bile, conſidered it as the receptacle of what they called *atra bilis*; and Havers, who wrote profeſſedly on the bones, determined its uſe to be that of ſecreting the ſynovia; but theſe opinions have long ſince been rejected, tho' the want of an excretory duct has occaſioned the real uſe of it to be ſtill doubtful: perhaps the blood undergoes ſome change in this viſcus, which may aſſiſt in the preparation of the bile. This is the opinion of the generality of modern phyſiologiſts; and the great quantity of blood with which it is ſupplied, and the courſe of its veins into the *vena porta* ſeem to render it probable (q).

CHAP. XI.

(N) The ancients, who were not acquainted with the real uſe of the liver, conſidered the bile as an excrementitious and uſeleſs fluid.

(o) In deer, and in ſome other quadrupeds, there ſeems to be an evident communication, by means of particular veſſels, between the liver and the gall bladder. Bianchi of Turin, and the celebrated M. Winflow have both aſſerted their exiſtence in the human ſubject, and have named them *hepatic-cystic-ducts*, but later obſervations tend to prove that no ſuch ducts exiſt. In obſtructions of the *cystic duct* for inſtance, the gall bladder has been found flannelled and empty; and the generality of anatomists of theſe times, ſeem to conſider the gall bladder as a reſervoir of hepatic bile.

(p) Theſe concretions ſometimes remain in the gall bladder without cauſing any uneaſineſs. Dr Heberden relates, that a gall ſtone weighing two drachms was found in the gall bladder of the late Lord Bath, though he had never complained of the jaundice, nor of any diſorder which he could attribute to that cauſe. *Med. Tranſ.*

(q) The late Mr Hewſon of London, in the ſecond part of his experimental inquiries ſays, he has been led to aſcertain the uſes of the lymphatic glands, the thymus, and the ſpleen; which have ſo long been conſidered as the *Opprobria* of anatomists; and he propoſed to deſcribe them in a future publication: but that very ingenious phyſiologiſt is ſince dead. An imperfect abſtract of his diſcoveries has appeared in the medical commentaries of Edinburgh, from which we are enabled to collect, that Mr Hewſon conſidered the ſpleen as an organ of great importance; that he rejected the ſuppoſition of its being ſubſervient to the liver, becauſe fluids of greater conſequence in the economy are prepared by one organ; that its ſtructure is very analogous to that of the lymphatic glands; that from its being ſometimes taken out without inconvenience, he ſuppoſed that ſomething elſe in the ſyſtem is capable of performing its functions; which he concluded to be the thymus, from their ſimilarity in ſtructure; that he conſidered the lymphatic veſſels, as the only excretory ducts of the ſpleen; and laſtly, that the lymphatic glands concurred with this organ and the thymus, in the formation of the red globules of the blood.

CHAP. XI.

Of the GLANDULÆ RENALES, KIDNEYS, and URETERS.

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Glandulæ
renales.

a. The *glandulæ renales*, which were by the ancients supposed to secrete the *atra bilis*, and by them named *capsulæ atrabilaries*, are two flat bodies of an irregular figure, one on each side between the kidney and the aorta.

b. In the fœtus they are as large as the kidneys, but they do not increase afterwards in proportion to those parts; and in adults and old people, they are generally found shrivelled, and much wasted. They have their arteries and veins. Their arteries usually arise from the splenic or the emulgent, and sometimes from the aorta; and their veins go to the neighbouring veins, or to the vena cava; their nerves are branches of the intercostal.

c. The use of these parts is not yet perfectly known. In the fœtus the secretion of urine must be in a very small quantity, and a part of the blood may perhaps then pass thro' these channels, which in the adult is carried to the kidneys, to supply the matter of urine.

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Kidneys.

a. The *kidneys* are two in number, situated one on the right, and the other on the left side in the lumbar region, between the last false rib and the os ilium, by the sides of the vertebræ. Each kidney in its figure resembles a fort of bean (x), which from its shape is called *kidney bean*. The concave part of each kidney is turned towards the aorta and vena cava ascendens. They are surrounded by a good deal of fat, and receive a coat from the peritonæum; and when this is removed, a very fine membrane is found investing their substance and the vessels which ramify through them.

b. Each kidney has a considerable artery and vein, which are called the *emulgent*. The artery is a branch from the aorta descendens, and the vein passes into the vena cava. Their nerves, which every where accompany the blood vessels, arise from a considerable *plexus*, which is derived from the intercostal.

c. In each kidney, which in the adult is of a pretty firm texture, there are three substances to be distinguished (s). The outer part is *glandular* or *cortical*, beyond this is the *vascular* or *tubular substance*; and the inner part is *papillary* or *membranous*.

d. It is in the cortical part of the kidney that the secretion is carried on; the urine being here received from the minute extremities of the capillary arteries, is conveyed out of this cortical substance by an infinite number of very small cylindrical canals or excretory vessels, which constitute the *tubular part*. These tubes as they approach the inner substance of the kidney, gradually unite together; and thus forming larger canals, at length terminate in ten or twelve little protuberances called *papillæ*, the orifices of which may be seen without the assistance of glasses. These papillæ

unite together to form one cavity or reservoir, which is called the *pelvis* of the kidney (r). From this pelvis the urine is conveyed thro' a membranous canal, which passes out from the hollow side of the kidney, a little below the blood vessels, and is called *ureter*.

a. The *ureters* are each about as large as a common writing pen. They are somewhat curved in their course from the kidneys like the letter *f*; and at length terminate in the posterior and almost inferior part of the bladder, at some distance from each other. They pass into the bladder in the same manner as the *ductus choledochus communis* passes into the *intestinum duodenum*, not by a direct passage, but by an oblique course between the several coats; so that the discharge of urine into the bladder is promoted, whilst its return is prevented. Nor does this mode of structure prevent the passage of fluids only from the bladder into the ureters, but likewise air: for air thrown into the bladder inflates it, and it continues to be defended if a ligature is passed round its neck; which seems to prove sufficiently that it cannot pass into the ureters.

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Ureters.

CHAP. XII.

Of the URINARY BLADDER, its office and contents.

a. The *urinary bladder* is a membranous bag, in Urinary bladder. shape not unlike a bottle with its neck downwards; situated in the pelvis, between the intestinum rectum and os pubis. The bottom of the bladder is covered by a production of the peritonæum, and it has three other tunics; of these, the external one is composed of fleshy or muscular fibres. The second is called its *nervous* coat, and within this is its *villous* coat, which resembles the *villous* coat of the intestines. The ureters have each the same number of coats, and the whole urinary passage is constantly moistened by a slimy liquor, which defends it against the acrimony of the urine.

b. The *neck of the bladder*, from which a canal is continued called the *urethra*, thro' which we discharge the urine; is encircled by muscular fibres, which are distinguished by the name of *sphincter vesicæ* (u).

c. This muscle, by closing the neck of the bladder, prevents an involuntary flow of urine; for without this *sphincter* it would constantly fall drop by drop from the urethra, as it is distilled thro' the ureters.

a. It will be easily conceived from what has been said, that the kidneys are two glandular bodies thro' which a saline and excrementitious fluid called *urine*, is constantly separating from the mass of blood; but though anatomists generally agree in asserting that the urine is separated from the blood by the mere action of filtration, yet its appearance is altogether unaccountable upon this supposition. It is impossible to filter from any thing what it does not previously contain; and both

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Urinary
bladder.

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The urine.

(g) The human kidneys are in shape much like the kidneys of sheep.

(s) The kidneys in the fœtus are distinctly lobulated, and apparently *conglomerate* in their structure; but in the adult, they become perfectly firm, smooth and regular, and would seem to be glands of the *conglobate* kind.

(r) The pelvis is not formed by the papillæ, as M. Perfon and some other writers have believed; but appears to be a distinct membranous bag, sending off processes which embrace the *papillæ*.

(u) In compliance with the most general method of anatomical writers, we have described the *sphincter vesicæ*; but there are some modern anatomists who are of opinion, that the neck of the bladder has no muscular fibres; and of this number is M. Lieutard, who contends that the urine is confined in the bladder by means of the levatores ani; and the particular structure of the bladder itself, which he describes as being adapted for this purpose. See *Lieutard, Essais Anatomiques*.

both the blood itself, and the chyle from which it is formed are exceedingly mild, without any saline principle; whereas the urine is full of salts, and those too of such a nature as are scarce to be found any where else. See URINE and CHEMISTRY, n^o. 308.

b, While only a small quantity of urine is collected in the bladder, it excites no kind of uneasiness; but when accumulated to a certain degree, the bladder becomes distended, the salts contained in the urine seem to become more active, and beginning to irritate the inner coat of the bladder, excite in us a certain sensation; which brings on as it were a voluntary contraction of the bladder to promote its discharge: but this contraction is not effected by the muscular fibres of the bladder alone, for all the abdominal muscles contract in obedience to our will, and press downwards all the viscera of the lower belly; and these powers being united, at length overcome the resistance of the *sphincter*, which dilates and affords a passage to the urine thro' the urethra.

c, The frequency of this evacuation depends on the quantity of urine secreted, on the degree of acrimony it possesses, on the size of the bladder, and on its degree of sensibility.

d, When the urine is loaded with acrid salts, a very small quantity of it is sufficient to irritate the inner surface of the bladder, and occasion its discharge; and the same effect will take place when the bladder is by any means inflamed.

e, Every body is conversant with the natural consistence of the urine. In a healthy state it is nearly of a straw colour. After being kept some time it deposits a tartareous matter, which is found to be composed chiefly of earth and salt, and soon incrusts the sides of the vessel in which it is contained. While this separation is taking place, appearances, like minute fibres or threads of a whitish colour, will be seen in the middle of the urine, and an oily scum will be observed floating on its surface. So that the most common appearances of the urine are sufficient to ascertain that it is not pure water, but a serosity, impregnated with earthy, saline, and oily particles.

f, The urine is not always voided of the same colour and consistence; for these are found to depend on the proportion of its watery part to that of its other constituent principles. Its colour and degree of fluidity seem to depend on the quantity of saline and inflammable particles contained in it; so that an increased proportion of those parts will constantly give the urine a higher colour, and add to the quantity of sediment.

g, The variety in the appearance of the urine, depends on the nature and quantity of solid and fluid aliment we take in; and it is likewise occasioned by the different state of the urinary vessels; by which we mean the canals thro' which it is separated from the blood, and conveyed thro' the pelvis into the ureters. If these passages are contracted, in consequence of inflammation, or any other means, their diameter is of course diminished; they permit only the more limpid parts of the blood to pass through them, and the urine is found to be perfectly clear and colourless like pure water. But,

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(v) The reader must consider this, only as one among many other causes of calculous concretions in the urinary passages, which are to be looked for in the natural constitution of the body, mode of life, &c. The urine itself, in people who have much natural tendency to these complaints, though seemingly pure and limpid when first secreted, has a wonderful disposition to concreate.

if, on the contrary, their diameter is encreased, they not only afford a passage to the watery part, which presents itself for secretion, but likewise to an increased quantity of other particles, which consequently give the urine a higher colour and add to its consistence.

h, If the urinary vessels are naturally of too loose and soft a texture, they will sometimes admit grosser particles (v), which they will not always be able to carry off; and these particles will not fail to accumulate in the canal, and occasion those painful distensions of it, which constitute the *nephritic colic*. The seat of this disease is sometimes in the kidney itself, and sometimes in the ureters; depending on the part where the passage of these concretions to the bladder is obstructed. When these concretions, or any extraneous body admitted into the bladder, continue to reside in it, they become a *nucleus* to a *calculus*; and if the urine continues to have a disposition to add to it, it gradually increases in size, and what is called a *calculus* or *stone*, is formed in the bladder; which can only be extracted by the operation of lithotomy, unless nature, by a favourable effort as is very often the case, carries it out of the bladder before it becomes too large to pass into the urethra.

i, It having been observed, that after drinking any light wine or Spa water, it very soon passed off by urine, it was supposed by some anatomists that the urine is not altogether conveyed to the bladder by the ordinary course of circulation, but that there must certainly exist some other shorter means of communication, perhaps by certain vessels between the stomach and the bladder; or that the fluid transudes thro' the coats of the stomach, and is then taken into the bladder by absorption; but, from some experiments on living animals, others have denied the truth of this doctrine. If we open the belly of a dog, press out the urine from the bladder, pass a ligature round the emulgent arteries, and then sew up the abdomen, and give him even the most diuretic liquor to drink, the stomach and other channels will be distended with it, but not a drop of urine will be found to have passed into the bladder. This experiment then, seems to prove that all the urine we evacuate is conveyed to the kidneys thro' the emulgent arteries, in the manner already described. It is true that wine and other liquors promote a speedy evacuation of urine, but the discharge seems to be merely the effect of the stimulus they occasion; by which the bladder and urinary parts are solicited to a more copious discharge of the urine, which was before in the body, and not immediately of that which was last drank; and this increased discharge, if the supply is kept up, will continue: nor will this appear wonderful, if we consider the great capacity of the vessels which go to the kidneys, the constant supply of fresh blood which is essential to health, and the rapidity with which it is incessantly circulated through the heart to all parts of the body.

CHAP. XIII.

The instruments and process of DIGESTION.

a, By *digestion* is to be understood the changes the aliment

aliment undergoes for the formation of chyle, these changes are effected in the mouth, stomach, and small intestines.

b, The *mouth*, of which every body has a general knowledge, is the cavity between the two jaws, the fore part and sides of which are formed by the lips, teeth, and cheeks; the back part terminating in the throat.

c, The lips and cheeks are made up of fat and muscles, covered by the cuticle, which is continued over the whole inner surface of the mouth, like a fine and delicate membrane. Besides this membrane, the inside of the mouth is furnished with a spongy and very vascular substance, called the *gums*, by means of which the teeth are secured in their sockets. A similar substance covers the roof of the mouth, and forming what is called the *velum palati*, terminates in a soft, small, and conical body, called the *uvula*; which appears as it were suspended from the middle of the arch over the basis of the tongue.

d, The *tongue* is composed of several muscles which enable it to perform a variety of motions, for the articulation of the voice, for the purposes of mastication, and for conveying the aliment into the pharynx. Its upper part is covered with *papille*, which constitute the organ of taste, and are easily to be distinguished; it is covered by the same membrane that lines the inside of the mouth, and which makes at its inferior part towards its basis a reduplication called the *frenum*.

e, Under the velum palati, and at the basis of the basis of the tongue, is the *pharynx*; which is the beginning of the œsophagus, stretched out every way so as to resemble the top of a funnel, through which the aliment passes into the stomach.

f, The *mouth* has a communication with the nostrils, at its posterior and upper part; with the ears by the eustachian tubes; with the lungs by means of the larynx; and with the stomach by means of the œsophagus.

g, The *pharynx* is constantly moistened by a fluid secreted by two considerable glands, called the *tonsils*; one on each side of the velum palati. These glands, from their supposed resemblance to almonds, have likewise been called *amygdalæ*. The tonsils, from some vicious disposition in the fluid they secrete, or from other causes, sometimes swell, and constitute what is called a *bastard quinsy*. In the *true quinsy*, which is a very acute disease, the pharynx or larynx, and sometimes both at the same time, are affected.

h, The mouth is moistened by a considerable quantity of saliva. This humour is derived from the *parotid glands*, a name by which its etymology points out their situation to be near the ears. They are two in number, one on each side under the os maxillæ, and are of the conglomerate kind; being formed of many smaller glands, each of which sends out a very small excretory duct, which uniting with each other, form one common channel, that runs over the cheek, and piercing the buccinator muscle, opens into the mouth on each side, by an orifice into which a bristle may be easily introduced. Besides these, the *maxillary glands*, which are placed near the inner surface of the angle of the lower jaw on each side; the *sublingual glands*, which are situated at the root of the tongue; and the *glands of the palate*, which are seated in the velum pa-

lati; together with many other less considerable ones, pour the saliva into the mouth through their several excretory ducts.

i, The *saliva*, like all the other humours of the body, is found to be different in different people; but in general, it is a limpid and insipid fluid, without smell in healthy subjects; and these properties would seem to prove that it contains very few saline or inflammable particles. It is so much disposed to fermentation, that the inhabitants of Otahite, and other barbarous nations, use it by way of yeast, to make their liquors ferment.

k, The uses of the saliva seem to be to moisten and lubricate the mouth, and to assist in reducing the aliment into a soft pulp before it is conveyed into the stomach.

a, The variety of functions which are constantly performed by the living body, must necessarily occasion a continual waste and dissipation of its several parts. A great quantity is every day thrown off by the insensible perspiration and other discharges; and were not these losses constantly recruited by a fresh supply of chyle, the body would soon effect its own dissolution. But nature has very wisely favoured us with organs fitted to produce such a supply, and has at the same time endued us with the sensations of *hunger* and *thirst*, that our attention may not be diverted from the necessary business of nutrition. Hurried on by the occurrences of life, we should perhaps without these admonitions, sometimes omit to take in the proper supply of aliment; but the demands of hunger are not to be withstood. This sensation is universally known; but it would perhaps be difficult to describe it perfectly in words. In describing the stomach, mention was made of the gastric juice, as every where lubricating its inner coat. This humour mixes itself with the aliment in the stomach, and helps to prepare it for its passage into the intestines; but when the stomach is perfectly empty, this same fluid irritates the coats of the stomach itself, and produces the sensation of hunger.

b, A certain proportion of liquid aliment is required to assist in the process of digestion, and to afford that moisture to the body, of which there is such a constant dissipation. *Thirst* induces us to take this necessary supply of drink; and the seat of this sensation is in the tongue, fauces, and œsophagus, which from their great sensibility are required to be kept moist; for although the fauces are naturally moistened by the mucus and salivary juices, yet the blood, when deprived of its watery part, or rendered acrimonious by any natural causes, never fails particularly to affect these parts, and the whole alimentary canal, and to occasion thirst. This is the common effect of fevers, and of hard labour; by both which too much of the watery part of the blood is dissipated.

a, It has been observed that the aliment undergoes some preparation in the mouth before it passes into the stomach; and this preparation is the effect of *mastication*. In treating of the upper and lower jaws, mention was made of the number and arrangement of the teeth. The upper jaw was described as being immovable; but the lower jaw was spoken of as being capable of elevation and depression, and of a grinding motion. The aliment, when first carried into the mouth, is pressed between the teeth of the two jaws by a very strong

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Hunger and
thirst.

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Mastication
and deglutition.

strong and frequent motion of the lower jaw; and the tongue and the cheeks assisting in this process, continue to replace the food between the teeth till it is perfectly divided, and reduced to the consistence of pulp. The incisores and canini, divide it first into smaller pieces; but it is between the surfaces of the dentes molares, by the grinding motion of the jaw, that the mastication is completed.

b, During this process, the salivary glands being gently compressed by the contraction of the muscles that move the lower jaw, and somewhat stimulated by the saline particles of the aliment, pour out their saliva, which helps to divide and break down the food, which at length becomes a kind of pulp, and is then carried over the basis of the tongue into the fauces. But to effect this passage into the œsophagus, it is necessary that the other openings which were mentioned as having a communication with the mouth as well as the pharynx, should be closed; that none of the aliment, whether solid or liquid, may pass into them, whilst the pharynx alone is dilated to receive it; such a disposition actually takes place in a manner we shall endeavour to describe.

c, The *trachea arteria* or *windpipe*, through which the air is conveyed to the lungs, is placed before the œsophagus in the act of swallowing, then if the larynx is not closed, (for so the upper part of the trachea is called,) the aliment will pass into it in its way to the œsophagus. But this is prevented by a small and very elastic cartilage, called *epiglottis*, which is attached only to the forepart of the larynx; so that the food in its passage to the œsophagus, presses down this cartilage which then covers the *glottis*, or opening of the larynx; and at the same time the *velum palati* being capable of some degree of motion, is drawn backwards by its muscles, and closes the openings into the nose and the eustachian tubes: this is however not all. The larynx, which being composed of cartilaginous rings, cannot fail in its ordinary state to compress the membranous canal of the œsophagus, is, in the act of *deglutition*, carried forwards and upwards by muscles destined for that purpose; and consequently drawing the forepart of the pharynx with it, that opening is fully dilated. When the aliment has reached the pharynx, its descent is promoted by its own proper weight, and by the muscular fibres of the œsophagus, which continue to contract from above downwards, until the aliment has reached the stomach. That these fibres have no considerable share in deglutition, any person may experience, by swallowing with his head downwards, when the descent of

the aliment cannot possibly be effected by its weight.

d, It is necessary that the nostrils and the lungs should communicate with the mouth, for the purposes of speech and respiration; but if the most minute part of our food happens to be introduced into the trachea, it never fails to produce a violent cough, and sometimes the most alarming symptoms; this is liable to happen when we laugh or speak, in the act of deglutition. The food is then said to have passed the wrong way; and indeed this is not improperly expressed, for death would soon follow, if the quantity of aliment introduced into the trachea should be sufficient to obstruct the respiration only during a very short time; or if the irritating particles of food should not soon be thrown up again by means of the cough, which in these cases very seasonably increases in proportion to the degree of irritation.

e, If the *velum palati* did not close the passage to the nostrils, deglutition would be performed with difficulty, and perhaps not at all; for the aliment would return thro' the nose, as is sometimes the case in drinking. Children, from a deficiency in this *velum palati*, have been seen to die a few hours after birth; and they who from disease or any other causes have not this part perfect, swallow with difficulty.

f, The aliment, after having been sufficiently divided by the action of the teeth, and attenuated by the saliva, is received into the stomach, where it is destined to undergo a more considerable change.

g, The properties of the aliment not being much altered at its first entrance into the stomach, and before it is thoroughly blended with the gastric juice, is capable of irritating the inner coat of the stomach to a certain degree, and occasions a contraction of its two orifices. In this membranous bag, surrounded by the abdominal viscera, and with a certain degree of natural heat, the aliment undergoes a constant agitation by means of the abdominal muscles, and of the diaphragm, and likewise by a certain contraction or expansion of the muscular fibres of the stomach itself. By this motion, every part of the food is exposed to the action of the gastric juice, which gradually divides and attenuates it, and prepares it for its passage into the intestines (w).

h, The more the particles of food have imbibed of the gastric juice, the less obstacle do they afford to the expansion of the air which is set loose by the process of digestion; and being rarified by the warmth of the stomach, tends to complete the perfect dissolution of the alimentary pulp.

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(w) Mr J. Hunter has lately obliged the public with the account of a very singular fact in the animal œconomy, which seems to throw considerable light on the principles of digestion: he informs us, that there are few dead bodies in which the stomach at its great end, is not found to be in some degree digested; he observes, that animals, or parts of animals, possessed of the living principle, when taken into the stomach, are not in the least affected by the action of that viscus; but that the moment they lose the living principle, they become subject to its digestive powers. This he supposes to be the case with the stomach, which is enabled to resist the action of its juices in the living body, but when deprived of the living principle, is then no longer able to resist the power of that menstruum, which it had itself formed for the digestion of its contents; the process of digestion appearing to be continued after death. Mr Hunter was confirmed in his ideas on this subject by observing what happens in the stomachs of fishes: they frequently swallow without mastication, fish which are larger than the digesting parts of their stomach can contain, and in such cases that part which is taken into the stomach, is more or less dissolved; while that part which remains in the œsophagus, is perfectly found; and here, as well as in the human body, the digesting part of the stomach is often reduced to the same state as the digested part of the food. These appearances the ingenious writer imagines, lead to prove that digestion is not effected by a mechanical power, by contractions of the stomach, or by heat; but by a fluid secreted in the coats of the stomach, which is poured into its cavity, and there animalizes the food, or assimilates it to the nature of blood.-----*Philos. Transf.* Vol. 62.

i, The food, after having remained during one, two, or three hours in the stomach, is converted into a greyish pulp, which is usually called *chymus*, a word of Greek etymology, signifying *juice*; and some few milky or chylous particles begin to appear; but the term of its residence in this bag is proportioned to the nature of the aliment, and to the state of the stomach and its juices. The thinner and more perfectly digested parts of the food, pass by a little at a time, into the duodenum, through the pylorus, the fibres of which relax to afford it a passage: and the grosser and less digested particles remain in the stomach till they acquire a sufficient fluidity to pass into the intestines, where the nature of the *chymus* is perfectly changed. The bile and pancreatic juice which flow into the duodenum, and the mucus which is every where distilled from the surface of the intestines, mix themselves with the alimentary pulp, which they still farther attenuate and dissolve, and into which they seem to infuse new properties.

k, Two matters very different from each other in their nature and destination, are the result of this combination. One of these which is composed of the liquid parts of the aliment, and of some of its more solid particles, extremely divided and mixed with the juices we have described, constitutes a very mild, sweet, and whitish fluid, resembling milk, and distinguished by the name of *chyle*. This fluid is absorbed by the lacteal veins, which convey it into the circulation, where by being assimilated into the nature of blood, it affords that supply of nutrition which the continual waste of the body is found to require. The other is the remains of the alimentary mass deprived of all its nutritious particles, and containing only such parts, as by their acrimony or their cohesion, were rejected by the absorbing mouths of the lacteals. This grosser part called the *feces*, passes on through the course of the intestines to be voided at the anus, as will be explained hereafter, for this process in the economy cannot well be understood till the motion of respiration has been explained. But the structure of the intestines is a subject which may be properly described in this place, and deserves to be attended to.

l, It has been already observed, that the intestinal canal is five or six times as long as the body, and that it forms many circulations, in the cavity of the abdomen, which it traverses from the right to the left, and again from the left to the right; in one place descending, and in another extending itself upwards. It was noticed likewise, that the inner coat of the intestines by being more capacious than their exterior tunics, formed a multitude of plaits placed at a certain distance from each other, and called *valvule conniventes*. Now this disposition will be found to afford a farther proof of that divine wisdom, which the anatomist and physiologist cannot fail to discover in all their pursuits; for if the intestinal canal was much shorter than it naturally is, if instead of its present circulations it passed in a direct course from the stomach, and if its inner surface was smooth and destitute of valves, the aliment would consequently pass with great rapidity to the anus, and sufficient time would be wanting to assimilate the chyle, and for the necessary absorption of it into the lacteals; so that the body would be deprived of the supply of nutrition, which is so essential to life and health, but the length and circulations of the in-

testines, the inequality of their internal surface, and the course of the aliment through them, all concur to perfect the separation of the chyle from the feces, and to afford the necessary nourishment to the body.

m, Digestion is performed with more or less ease, according to the temperaments, age, sex, strength, exercise, passions, &c. In some it is long and difficult, in others quick and easy, in its process. Every one ought to adapt the quantity and kind of aliment he takes in, to the state of his stomach and the powers of its juices, which can only be learned by experience and attentive observation.

n, It seems to be very easy to demonstrate, that he who loads his stomach with more than he is able to digest, will derive from it only a crude and imperfect chyle, by no means calculated to afford a good and wholesome blood, and to promote a healthy constitution of body.

o, In a recovery from sickness, the patient often thinks he is making hasty advances towards health, by eating more than his stomach will perhaps allow him to take in with ease; and he is led to imagine that his strength will increase in proportion to the quantity he eats and drinks; but on this point his notions are erroneous; for the stomach, like all other parts impaired by sickness, recovers its tone slowly, and is unable to assimilate such a load of materials into chyle; so that the digestion is crude and imperfect, and the blood, as well as the other juices of the body, partaking of the vicious properties of the chyle, the recovery of health is rather retarded than promoted, and sometimes other diseases are produced. Whereas, by taking in a less quantity of food at a time, the stomach is enabled to digest it perfectly, and to afford that wholesome and perfect supply of chyle, which will not fail to nourish the body and restore it to health. For it is worthy of observation, that nutrition is not derived altogether from the quantity we eat, but from the quantity we digest.

CHAP. XIV.

Of the course of the CHYLE, and of the LYMPHATIC SYSTEM.

a, An infinite number of very minute vessels called the *lacteal veins*, arise like net-work from the inner surface of the intestines, but principally from the *jejunum* and *ilium*, which are destined to imbibe the nutritious fluid or chyle. These vessels pass obliquely thro' the coats of the intestine, and, running along the mesentery, unite as they advance, and form larger branches, all which pass through the mesenteric or conglobate glands, which are very numerous in the human subject. As they run between the intestines and these glands, they are styled *vena lactea primi generis*; but after leaving these glands, they are found to be less numerous, and being increased in size, are then called *vena lactea secundi generis*, which go to deposit their contents in the *thoracic duct*, thro' which the chyle is conveyed into the blood.

b, This *thoracic duct* begins about the lower part of the first vertebra lumborum, from whence it passes up by the side of the aorta, between that and the *vena azygos* close to the vertebrae, being covered by the pleura. Sometimes it is found divided into two branches

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Of the lacteals.

branches, but they usually unite again into one canal, which opens into the left subclavian vein, after having run a little way in an oblique course between its coats. The subclavian vein communicates with the vena cava, which passes to the right auricle of the heart.

c, The lower part of this duct being usually larger than any other part of it, has been named *receptaculum chyli*, or *Pecquet's receptacle*, in honour of the anatomist who first discovered it in 1651. In some quadrupeds, in turtle, and in fish, this enlargement is more considerable in proportion to the size of the duct, than it usually is in the human subject, where it is not commonly found large enough to merit the name of *receptaculum*.

d, The opportunities of observing the lacteals in the human subject, do not often occur; but they may easily be demonstrated in a dog or any other quadruped that is killed two or three hours after feeding upon milky, for then they appear filled with white chyle.

e, But these *lacteals* which we have described as passing from the intestines through the mesentery to the thoracic duct, compose only a part of a system of vessels which perform the office of *absorption*, and which constitute with their common trunk the thoracic duct, and the conglobate glands which are dispersed through the body, what may be styled the *lymphatic system*. So that what is said of the structure of one of these series of vessels, may very properly be applied to that of the other.

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the lymph-
atic vessel-
a, The *lymphatic veins* (x) are minute pellucid tubes, which, like the lacteals, direct their course towards the centre of the body, where they pour a colourless fluid into the thoracic duct. The lymphatics from all the lower parts of the body, gradually unite as they approach this duct, into which they enter by three or four very large trunks, which seem to form the lower extremity of this canal, or *receptaculum chyli*. The lacteals open into it near the same place, and the lymphatics from all the upper parts of the body, pour their lymph into different parts of this duct as it runs upwards to terminate in the left subclavian vein.

b, As the lymphatics commonly lie close to the large blood vessels, as a ligature passed round the crural artery in a living animal, by including the lymphatics, will occasion a distension of these vessels below the ligature so as to demonstrate them with ease; and a ligature passed round the thoracic duct, instantly after killing an animal, will, by stopping the course of its contents into the subclavian vein, distend not only the lacteals, but also the lymphatics in the abdomen and lower extremities with their natural fluids (y).

c, The coats of these vessels are too thin to be sepa-

rated from each other; but the mercury they are capable of sustaining, proves them to be very strong; and their great power to contract after undergoing considerable distension, together with the irritability with which Baron Haller found them to be endued, seems to render it probable, that, like the blood-vessels, they have a muscular coat.

d, The lymphatics are nourished after the same manner as all the other parts of the body. For even the most minute of these vessels are probably supplied with still more minute arteries and veins. This seems to be proved by the inflammation of which they are susceptible; and the painful swellings which sometimes take place in lymphatic vessels, prove that they have nerves as well as blood vessels.

e, Both the lacteals, lymphatics, and thoracic duct, are furnished with valves which are much more common in these vessels than in the red veins. These valves are usually in pairs, and serve to promote the course of the chyle and lymph towards the thoracic duct, and to prevent its return. Mention has been made of the glands, through which the lacteals pass in their course thro' the mesentery; and it is to be observed, that the lymphatics pass through similar glands in their way to the thoracic duct. These glands are all of the conglobate kind, but the changes which the chyle and lymph undergo in their passage through them have not yet been ascertained.

f, The *lymphatic vessels* begin from surfaces and cavities in all parts of the body as *absorbents* (z). This is a fact now universally allowed; but how the fluids they absorb are poured into those cavities, is a subject of controversy among the anatomists of these times. The contents of the abdomen, for instance, were described as being constantly moistened by a very thin watery fluid. The same event takes place in the pericardium, pleura, and all the other cavities of the body, and this watery fluid is the *lymph*. But whether it is exhaled into those cavities through the minute ends of arteries, or transfused through their coats, are the points in dispute. We cannot here be permitted to relate the many ingenious arguments that have been advanced in favour of each of these opinions; nor is it perhaps of consequence to our present purpose, to enter into the dispute. It will be sufficient if the reader can form an idea of what the lymph is, and of the manner in which it is absorbed.

g, The *lymph*, from its transparency and want of colour, would seem to be nothing but water; and hence the first discoverers of these vessels styled them *ductus aquosi*; but experiments prove that the lymph of a healthy animal coagulates by being exposed to the air, or

(x) The arteries in their course through the body becoming gradually too minute to admit the red globules of the blood, have then been styled *capillary* or *lymphatic arteries*. The vessels which are here described as constituting the lymphatic system, were at first supposed to be continued from those arteries, and intended to convey back the lymph either into the red veins or the thoracic duct, the office of absorption having been attributed to the *red veins*. But succeeding anatomists have clearly demonstrated, that the *lymphatic veins* are not continuations of the *lymphatic arteries*, but that they constitute the *absorbent system*. There are still however some very respectable names among the anatomists of the present age, who contend, that the red veins act likewise as absorbents; but it seems to have been clearly proved, that the red veins do absorb no where but in the cavernous cells of the penis, the erection of which is occasioned by a distension of those cells with arterial blood.

(y) In the dead body they may be easily demonstrated by opening the artery ramifying through the viscus, as in the spleen for instance, and then throwing in air; by which the lymphatics will be distended. One of them may then be punctured, and mercury introduced into it through a blow pipe.

(z) Lymphatics have never yet been discovered in the brain; though it would seem probable from analogy, that this organ is not destitute of them.

or a certain degree of heat, and likewise by being suffered to rest; seeming to agree in this property with that part of the blood called the *coagulable lymph*. This property of the lymph leads to determine its use in moistening and lubricating the several cavities of the body, in which it is found; and for which, by its gelatinous principle, it seems to be much better calculated than a pure watery fluid would be, for such it has been supposed to be by some anatomists.

h, The mouths of the *lymphatics* and *lacteals*, by acting as capillary tubes, seem to absorb the *lymph* and *chyle*, in the same manner as a capillary tube of glass, when put into a basin of water, will be enabled to attract the water into it to a certain height. In the opinion of most natural philosophers, the *lymph* or the *chyle* is conveyed upon this principle, as far as the first pair of valves, which seem to be placed not far from the orifice of the absorbing vessel, whether *lymphatic* or *lacteal*; and the fluid will then be propelled forwards by a continuation of the absorption at the orifice. But this does not seem to be the only inducement to its progress towards the thoracic duct; these vessels have probably a muscular coat, which may serve to press the fluid forwards from one pair of valves to another; and as the large lymphatic vessels and the thoracic duct are placed close to the large arteries, which have a considerable pulsation, it is reasonable to suppose that they derive some advantages from this situation.

CHAP. XV.

Of the GENERATIVE ORGANS.

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The male
organs.

a, THE male organs of generation have been usually divided into the parts which serve to prepare the semen from the blood, and those which are destined to convey it into the womb. But it seems to be more proper to distinguish them into the *preparing*, the *containing*, and the *expelling* parts, which are the different offices of the *testes*, the *vesiculae seminales*, and the *penis*; and this is the order in which we propose to describe them.

b, The testes are two glandular bodies serving to secrete the semen from the blood. They are originally formed and lodged within the cavity of the abdomen, and it is not till after the child is born, or very near that time, that they begin to pass into the groin, and from thence into the scrotum. By this disposition they are very wisely protected from the injuries to which they would be liable to be exposed, from the different postures and dispositions of the child at the time of parturition.

c, The testicles in this state are loosely attached to the *plac muscles* by means of the peritonæum by which they are covered; and they are at this time of life connected in a very particular manner to the parietes of the abdomen, and likewise to the scrotum, by means of a substance which Mr Hunter calls the *ligament*, or *gubernaculum testis*; because it connects the testis with the scrotum; and directs its course in its descent; this *gubernaculum* he describes, as being of a pyramidal form, with its bulbous head fixed to the lower end of the *testis* and *epididymis*, and as losing its lower and slender extremity in the cellular membrane of the scrotum. Mr Hunter says, it is difficult to ascertain what the structure and composition of this *gubernaculum* is; but he thinks it is certainly vascular and fibrous; and

from certain circumstances is led to suspect, that it is in part composed of the cremaster muscle running upwards to join the lower end of the testis.

d, We are not to suppose that the testicle when descended into the scrotum, is to be seen loose as a piece of gut or omentum would be in a common hernial sac. We have already observed, that during its residence in the cavity of the abdomen, it is attached to the peritonæum, which descends with it; so that when the sac is completed in the scrotum, the testicle is at first attached only to the *posterior* part of it, while the *fore* part lies loose, and for some time affords a communication with the abdomen. The *spermatic chord*, which is made up of the *spermatic artery* and *vein*, and of the *vas deferens* or *excretory duct of the testis*, is closely attached behind to the posterior part of this elongation of the peritonæum. But the *fore* part of the peritonæal sac, which is at first loose, and not attached to the testicle, closes after a certain time, and becomes united to the *posterior* part, and thus perfectly surrounds the testicle as it were in a purse.

e, The testicles of the fœtus differ only in their size and situation from those of the adult; in their passage from the abdomen they descend through the abdominal rings into the scrotum, where they are supported and defended by various integuments.

f, What the immediate cause of this descent is, has not yet been satisfactorily determined. It has been ascribed to the effects of respiration, but the testicles have sometimes been found in the scrotum before the child has breathed; and it does not seem to be occasioned by the action of the cremaster muscle, because the same effect would be liable to happen in the hedgehog, and some other quadrupeds, whose testicles remain in the abdomen during life.

g, The *scrotum*, which is the external or common covering of both testicles, is a kind of sac formed by the common integuments; and externally divided into two equal parts by a prominent line, called *raphe*.

h, In the inner part of the scrotum we meet with a cellular coat called *dartos*, which by its duplicature, divides the scrotum into two equal parts, and forms what is called *septum scroti*, which corresponds with the *raphe*. The collapion which is so often observed to take place in the scrotum of the healthy subject, when excited by cold or by the stimulus of venery, is by some attributed to the contractile motion of the skin, and not to any muscular fibres, as is the case in dogs and some other quadrupeds.

i, The scrotum then, by means of its septum, is found to make two distinct bags in which the testicles, invested by their proper tunics, are securely lodged and separated from each other. These coats are the *cremaster*, the *tunica vaginalis*, and the *tunica albuginea*. The first of these is composed of muscular fibres, and is to be considered only as a partial covering of the testis; for it surrounds only the spermatic chord, and terminates upon the upper and external parts of the *tunica vaginalis testis*; serving to draw up and suspend the testicle. The *tunica vaginalis testis* has already been described, as being originally a thin production of the peritonæum, loosely adhering every where to the testicle, which it includes as it were in a bag. The *tunica albuginea*, is a firm, white, and very compact membrane, of a glistening appearance; which immediately invests

invests the body of the testis and the epididymis; serving in some measure to connect them to each other, but without extending itself at all to the spermatic chord. This tunica albuginea serves to confine the growth of the testis and epididymis within certain limits, and by giving them a due degree of firmness, enables them to perform their proper functions.

k, Having removed this last tunic, we discover the substance of the testicle itself, which appears to be made up of an infinite number of very elastic filaments, which may be best distinguished after macerating the testicle in water. Each testicle is made up of the spermatic artery and vein, and the excretory vessels or tubuli seminiferi. There are likewise a great number of absorbent vessels, and some branches of nerves to be met with in the testicles.

l, The *spermatic arteriæ* arise one on each side from the aorta, generally about an inch below the emulgent. The *right spermatic vein* commonly passes into the *vena cava*; but the *left spermatic vein* usually empties itself into the *emulgent* on that side; and it is supposed to take this course into the emulgent, that it may avoid passing over the aorta, which it would be obliged to do in its way to the *vena cava*.

m, The blood is circulated very slowly through the spermatic artery, which makes an infinite number of circulations in the substance of the testicle, where it deposits the semen, which passes through the *tubuli seminiferi*. These *tubuli seminiferi* are seen running in short waves from the tunica albuginea to the axis of the testicle; and are divided into distinct portions by certain thin membranous productions, which originate from the tunica albuginea. They at length unite, and by an infinite number of convolutions form a sort of appendix to the testis, called *epididymis*; which is a vascular body of an oblong shape, situate upon the superior part of each testicle. These tubuli of the epididymis, at length form an excretory duct, called *vas deferens*; which ascends towards the abdominal rings, with the other parts that make up the spermatic chord, and then a separation takes place; the nerves and blood vessels passing on to their several terminations, and the *vas deferens* going to deposit its semen in the *vesicula seminales*, which are two soft bodies of a white and convoluted appearance externally, situated obliquely between the rectum and the lower part of the bladder, and uniting together at their lower extremity. From these reservoirs, which are plentifully supplied with blood-vessels and nerves, the semen is occasionally discharged thro' two short passages, which open into the urethra, close to a little eminence called *verumontanum*.

n, Near this eminence we meet with the *prostate*, which is situated at the neck of the bladder, and is described as being of a glandular structure. It is shaped somewhat like a heart with its small end foremost, and invests the origin of the *urethra*. It is supposed to secrete a whitish and cream-like liquor, which is discharged into the urethra on each side of the openings of the *vesiculae seminales*, at the same time, and from the same causes that the semen is expelled, to which it seems to give a white colour and considerable viscosity; the semen we meet with in the *vesiculae seminales* of the dead subject being exceedingly limpid.

o, The *penis* which is to be considered as the vehicle, or active organ of procreation; is composed of two co-

lums, the *corpora cavernosa*, and *corpus spongiosum*. The *corpora cavernosa*, which constitute the greatest part of the penis, may be described as two cylindrical, ligamentous tubes, each of which is composed of an infinite number of minute cells of a spongy texture, which communicate with each other. These two bodies are of a very pliant texture, and capable of considerable distention; and being united laterally to each other, occasion by this union, a space above, and another below. The uppermost of these spaces is filled by the blood-vessels, and the lower one which is larger than the other by the urethra. These two cavernous bodies are at first only separated by a partition of tendinous fibres, which allow them to communicate with each other; but they afterwards divaricate from each other like the branches of the letter Y, and diminishing gradually in size, are attached, one on each side, by means of the *ligamentum suspensorium penis*, to the *ramus ischii*, and to the inferior portion of the os pubis.

p, The *corpus spongiosum penis* or *corpus spongiosum urethrae*, as it is styled by some authors, begins as soon as the urethra has passed the *prostate*, with a thick origin almost like a heart, first under the urethra, and afterwards above it, becoming gradually thinner; and surrounding the whole canal of the urethra, till it terminates in a considerable expansion, and constitutes what is called the *glans penis*, which is exceedingly vascular, and covered with papillae like the tongue. The cuticle which lines the inner surface of the urethra, is continued over the *glans* in the same manner as it is spread over the lips.

q, The penis is invested by the common integuments, but the cutis is reflected back every where from the glans as it is in the eye lids, so that it covers this part when the penis is in a relaxed state as it were with a hood, and from this use is called *prepuce*.

r, The *prepuce* is tied down to the under part of the *glans* by a small ligament called *frænum*, which is in fact only a continuation of the cuticle and cutis. There are many simple sebaceous follicles called *glandulae odoriferae*, placed round the basis of the *glans*; and the fluid they secrete serves to preserve the exquisite sensibility of this part of the penis, and to prevent the ill effects of attrition from the prepuce.

s, The *urethra* may be defined to be a membranous canal passing from the bladder through the whole extent of the penis. Several very small openings called *lacunae*, communicate with this canal, through which a mucus is supposed to be discharged into it; and besides these, there are other glands first described by Cowper, as secreting a fluid for lubricating the urethra, and called *Cowper's glands*; and M. Littré speaks of a gland situated near the prostate, as being destined for the same use.

t, The *urethra* being continued from the neck of the bladder, is to be considered as making part of the urinary passage; and it likewise affords a conveyance to the semen, which we have observed is occasionally discharged into it from the *vesiculae seminales*. The direction of this canal being first under, and then before the pubis, occasions a winding in its course from the bladder to the penis, not unlike the turns of the letter S.

u, The penis has three pair of muscles, the *erectores*, *acceleratores*, and *transversales*. The first originate from the tuberosity of the ischium, and terminate in the cor-

p^ora cavernosa. The *acceleratores* arise from the sphincter, and by their insertion serve to compress the bulbous part of the urethra; and the *transversales* are declined to afford a passage to the semen, by dilating the canal of the urethra.

v. The arteries of the penis are chiefly derived from the internal iliacs. Some of them are supposed to terminate by pabulous orifices within the corpora cavernosa, and corpus spongiosum; and others terminate in veins, which at last make up the *vena magna dorsæ penis*, and other smaller veins which are in general distributed in like order with the arteries.

w. Its nerves are large and numerous; they arise from the great sciatic nerve, and accompany the arteries in their course through the penis.

x. We have now described the anatomy of this organ, and there only remains to be explained, how it is enabled to attain that degree of firmness and distention which is essential to the great work of generation.

y. The greatest part of the penis has been spoken of, as being of a spongy and cellular texture plentifully supplied with blood vessels and nerves; and as having muscles to move it in different directions: now, the blood is constantly passing into its cells through the small branches of the arteries which open into them, and is from thence as constantly absorbed by the pabulous orifices of some of its veins, so long as the corpora cavernosa and corpus spongiosum continue to be in a relaxed and pliant state. But when from any nervous influence or other means, which it is not necessary here to define or explain, the erectores or other muscles of the penis, are induced to contract; the veins undergo a certain degree of compression, and the passage of the blood through them is so much impeded that it collects in them a greater proportion than they are enabled to carry off: so that the penis gradually enlarges, and being more and more forcibly drawn up against the os pubis, the vena magna itself is at length compressed, and the penis becomes fully distended. But as the causes which first occasioned this distention subside, the penis gradually returns to its state of relaxation.

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Female or-
gans.

a. Anatomical writers usually divide the female organs of generation into *external* and *internal*. In the first division they include the *mons veneris*, *labia pudendi*, *perinaeum*, *clitoris*, *nymphæ*, and *caruncule myrtiformes*; and in the latter, the *vagina*, with the *uterus* and its appendages.

b. The *mons veneris* which is placed on the upper part of the symphysis pubis, is internally composed of adipose membrane which makes it soft and prominent: it divides into two parts called *labia pudendi*, which descending towards the rectum, from which they are divided by the perinaeum, form what is called the *fourchette*. The perinaeum is that fleshy space which extends about an inch and a half from the *fourchette* to the anus, and from thence about two inches to the coccyx.

c. The *labia pudendi* being separated, we observe a sulcus called *fossa magna*; in the upper part of which is placed the clitoris, a small round spongy body, in some measure resembling the male penis, but imper-

vious, composed of two corpora cavernosa arising from the tuberosities of the ossa ischii; furnished with two pair of muscles, the *erectores clitoridis*, and the *sphincter vaginae* (A); and terminating in a *glans* which is covered with its prepuce. From the lower part, on each side of the fossa, pass the *nymphæ*, two membranous and spongy folds which seem destined for useful purposes in parturition, by tending to enlarge the volume of the vagina as the child's head passes through it. Between these, about the middle of the fossa magna, we perceive the orifice of the *vagina* or *os externum*, closed by folds and wrinkles; and about half an inch above this, and about an inch below the clitoris, appears the *meatus urinarius* or orifice of the *urethra*, much shorter, tho' somewhat larger than in men, with a little prominence at its lower edge, which facilitates the introduction of the catheter.

d. In children the orifice of the vagina is found partly closed by a thin membrane called *hymen*; the form of which is different in different subjects, being in some shaped like a crescent, and in others of a circular form. In general, it is sufficiently open to admit the passage of the menses if it exists at the time of their appearance; but instances are related of its having been found perfectly closed, in which case it is to be divided longitudinally. When this membrane is ruptured by the venereal congress or any other causes, it recedes and forms (it is thought) the *caruncule myrtiformes*, which are sometimes totally effaced in women who have had many children.

e. The *vagina*, situated between the urethra and the rectum, is composed of two membranes, one of which is muscular and the other a continuation of that which covers the fossa magna, surrounded with a spongy cellular substance. It terminates in the uterus about half an inch above the os tincæ, and is wider and shorter in women who have had children than in virgins.

f. All these parts are plentifully supplied with blood-vessels, and nerves. Around the nymphæ, there are sebaceous follicles which pour out a fluid to lubricate the inner surface of the vagina; and the *meatus urinarius*, like the urethra in the male subject, is constantly moistened by a secreted mucus, which defends it against the acrimony of the urine.

g. The *uterus* is a hollow viscus, situated in the hypogastric region between the rectum and the bladder. It is destined to receive the first rudiments of the fœtus, and to assist in the development of all its parts till it arrives at a state of perfection and is fitted to enter into the world, at the time appointed by the wife author of nature.

h. The uterus in its unimpregnated state, resembles in shape a pear, somewhat flattened; with its *fundus* or bottom-part turned towards the abdomen, and its *cervix* or neck surrounded by the vagina. The entrance into its cavity forms a little protuberance, which has been compared to the mouth of a tench, and is called *os tincæ*.

i. The substance of the uterus, which is of a considerable thickness, appears to be composed of many glands interwoven with small ligamentous fibres, small branches of nerves, some lymphatics, and with arteries and

(A) Although in conformity to the generality of writers, the clitoris is here described as having two pair of muscles, the *erectores* alone seem strictly to belong to it: the sphincter vaginae having no connection with the clitoris.

and veins innumerable. Its nerves are chiefly derived from the intercostal, and its arteries and veins from the hypogastric and hemorrhoidal. The membrane which lines its cervix, is a continuation of the inner membrane of the vagina; but the outer surface of the body of the uterus is covered with the peritonæum, which is reflected over it, and descends from thence to the intestinum rectum. This duplicature of the peritonæum, by passing off from the sides of the uterus to the sides of the pelvis, is there firmly connected, and forms what are called *ligamenta uteri lata*; which serve not only to support the uterus, but to convey nerves and blood-vessels to it.

k, The *ligamenta uteri rotunda* arise from the sides of the fundus uteri, and passing along within the fore-part of the ligamenta lata, descend through the abdominal rings, and terminate in the substance of the mons veneris. The substance of these ligaments is vascular; and although both they and the ligamenta lata admit the uterus, in the virgin state, to move only about an inch up and down; yet in the course of pregnancy they admit of considerable distention, and after parturition return nearly to their original state with surprising quickness.

l, On each side of the inner surface of the uterus, in the angle near the fundus, a small orifice is to be discovered, which is the beginning of one of the *tuba fallopiæ*. Each of these tubes, which are two in number, passing through the substance of the uterus, is extended along the broad ligaments, till it reaches the edge of the pelvis, from whence it reflects back; and

turning over behind the ligaments, about an inch of its extremity is seen hanging loose in the pelvis, near the ovarium. These extremities having a jagged appearance, are called *fimbræ* or *morfus diaboli*. Each tuba fallopiæ is usually about three inches long. Their cavities are at first very small, but become gradually larger, like a trumpet, as they approach the fimbræ.

m, Near the fimbræ of each tuba fallopiæ, about an inch from the uterus, is situated an oval body called *ovarium*, of about half the size of the male testicle. Each of these *ovaria* is covered by a production of the peritonæum, and hangs loose in the pelvis. They are of a flat and angular form; and appear to be composed of a white and cellular substance, in which we are able to discover several minute vesicles filled with a coagulable lymph, of an uncertain number, but not often exceeding twelve in each ovary. In the female of riper years, these vesicles become exceedingly turgid; and a kind of yellow coagulum is gradually formed within one of them, which increases till its coat disappears; and it then changes into an hemispherical body, called *corpus luteum*, which resembles a bunch of currants, and is described as being hollow, and containing within its cavity the very minute membranes or eggs, each of which may become the seat of a fœtus. In conception *, one of these mature ova is supposed to be impregnated with the male semen, and to be squeezed out of its nidus into the fallopian tube; and Baron Haller observes, that the number of scars or fissures in the ovarium constantly corresponds with the number of fœtuses excluded by the mother.

* See Conception and Generation.

PART V. OF THE THORAX.

373. [375.]
Of the chest.

a, THE *thorax*, or chest, is that cavity of the trunk which extends from the clavicles, or lower part of the neck, to the diaphragm; and includes the vital organs, which are the heart and lungs; and likewise the trachea and œsophagus. This cavity is formed by the ribs and vertebrae of the back, covered by a great number of muscles, and by the common integuments, and anteriorly by two glandular bodies called the *breasts*. The spaces between the ribs are filled up by muscular fibres, which from their situation are called *intercostal muscles*.

CHAP. I.

Of the BREASTS (B).

376 a, THE *breasts* may be defined to be two large conglomerate glands mixed with a good deal of adipose membrane. The glandular part is composed of an infinite number of minute arteries, veins, and nerves.

b, The arteries are derived from two different trunks; one of which is called the *internal*, and the other the *external, mammary artery*. The first of these arises from the subclavian, and the latter from the axillary.

c, The veins every where accompany the arteries, and are distinguished by the same name. The nerves are chiefly from the vertebral pairs. Like all other conglomerate glands, the breasts are made up of a great

many small distinct glands, in which the milk is secreted from the ultimate branches of arteries. The excretory ducts of these several glands, gradually uniting as they approach the nipple, form the *tubuli lactiferi*, which are usually about seven or eight in number, and open at its apex. These ducts, in their course from the glands, are surrounded by a ligamentary elastic substance, which terminates with them in the nipple. Both this substance, and the ducts which it contains, are capable of considerable extension and contraction; but in their natural state are moderately corrugated, so as to prevent an involuntary flow of milk, unless the distending force be very great, from the accumulation of too great a quantity.

d, The whole substance of the nipple is very spongy and elastic; its external surface is uneven, and full of small tubercles. The nipple is surrounded with a disk or circle of a different colour, called the *areola*; and on the inside of the skin, under the areola, are many sebaceous glands, which pour out a mucus to defend the areola and nipple; for the skin upon these parts is very thin, and the nervous papillæ lying very bare are much exposed to irritation.

e, The breasts are formed for the secretion of milk, which is defined for the nourishment of the child for some time after its birth. This secretion begins to take place soon after delivery, and continues to flow for

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(b) What is here said is to be considered as being applicable only to the female breasts, those of the male subject not seeming to need a particular description.

many months in very large quantities, if the woman suckles her child.

f, The operation of suction depends on the principles of the air-pump, and the flow of milk through the lactiferous tubes is facilitated by their being stretched out.

g, The milk, in its properties, seems to resemble the chyle. It appears to be composed of oil, mucilage; and water, with a considerable quantity of sugar; and, like the chyle, frequently retains the nature of the aliments and medicines taken into the stomach.

CHAP. II.

Of the PLEURA.

377

a, THE cavity of the thorax is every where lined by a membrane of a firm texture, called *pleura*. It is composed of two distinct portions or bags, which, by being applied to each other laterally, form a septum called *mediastinum*; which divides the cavity into two parts; and is attached to the vertebræ of the back behind, and before to the sternum. But the two laminae of which this septum is formed, do not every where adhere to each other: for at the lower part of the thorax they are separated, to afford a lodgement to the heart; and at the upper part of the cavity they receive between them the thymus.

b, The pleura is plentifully supplied with arteries and veins from the intercostals; and its nerves are derived from the vertebral pairs. This membrane is exceedingly sensible; and it is to this sensibility we owe the painful stitch we sometimes feel in the side, and which, when in a certain degree, constitutes a very acute disease, called the *pleurisy*, which is occasioned by an inflammation of this membrane.

c, The inner surface of the pleura is smooth; and, like all the other cavities, is constantly moistened by the lymph (c).

d, The mediastinum (d), by dividing the breast into two cavities, obviates many inconveniences to which we should otherwise be liable. It prevents the two lobes of the lungs from compressing each other when we lie on one side; and consequently contributes to the freedom of respiration, which is disturbed by the least pressure on the lungs. If the point of a sword penetrates between the ribs into the cavity of the thorax, the lungs on that side cease to perform their office; because the air being admitted through the wound, prevents the dilatation of that lobe; while the other lobe, which is separated from it by the mediastinum, remains unharmed, and continues to perform its function as usual.

CHAP. III.

Of the THYMUS.

378

a, THE *thymus* is a glandular substance, the use of which is not yet perfectly ascertained. It is of an oblong figure; and is larger in the fetus and in young children than in adults; being sometimes nearly effaced

(c) When this fluid is exhaled in too great a quantity, or is not properly carried off, it accumulates and constitutes the *hydrops pectoris*.

(d) Sometimes matter collects between the two laminae of the mediastinum; and surgical authors, in such cases, direct to trepan the sternum. But the disease does not seem often to occur; and when it does happen, cannot be distinguished with certainty. In a patient who died of that disorder of the breast named by Dr Heberden *angina pectoris*, Dr Haygarth of Chester, found a collection of what appeared to be pus, between these laminae, which had occasioned sudden death by breaking into the trachea, and thus producing suffocation.

in very old subjects. It is placed in the upper part of the thorax, between the two laminae of the mediastinum; but at first is not altogether contained within the cavity of the chest, being found to border upon the upper extremity of the sternum.

CHAP. IV.

Of the DIAPHRAGM.

379

a, THE cavity of the thorax is separated from that of the abdomen, by a fleshy and membranous septum called the *diaphragm* or *midriff*. The greatest part of it is composed of muscular fibres; and, on this account, systematic writers usually place it very properly among the muscles. Its middle part is tendinous; and it is covered by the pleura above, and by the peritoneum below. It seems to have been improperly named *septum transversum*; as it is does not make a plain transverse division of the two cavities, but forms a kind of vault, the fore-part of which is attached to the sternum. Laterally it is fixed to the last of the true ribs, and to all the false ribs; and its lower and posterior part is attached to the vertebræ lumborum, where it may be said to be divided into two portions or *crura*.

b, The principle arteries of the diaphragm are derived from the aorta; and its veins pass into the vena cava. Its nerves are chiefly derived from the cervical pairs. It affords a passage to the vena cava through its tendinous part, and to the œsophagus through its fleshy portion. The aorta passes down behind it, between its *crura*.

c, The diaphragm not only serves to divide the thorax from the abdomen, but by its muscular structure is rendered one of the chief agents in respiration. When its fibres contract, its convex side, which is turned towards the thorax, becomes gradually flat, and, by increasing the cavity of the breast, affords room for a complete dilatation of the lungs, by means of the air which is then drawn into them by the act of *inspiration*. The fibres of the diaphragm then relax; and as it resumes its former state, the cavity of the thorax becomes gradually diminished, and the air is driven out again from the lungs by a motion contrary to the former one, called *expiration*.

d, It is in some measure by means of the diaphragm that we void the feces at the anus, and empty the urinary bladder. Besides these offices, the acts of coughing, sneezing, speaking, laughing, gaping, and sighing, could not take place without its assistance; and the gentle pressure, which all the abdominal viscera receive from its constant and regular motion, cannot fail to assist in the performance of the several functions which were ascribed to those viscera.

CHAP. V.

Of the TRACHEA.

a, THE *trachea*, or *windpipe*, is a cartilaginous and membranous canal, through which the air passes into the

380

the lungs. Its upper part, which is called the *larynx*, is composed of five cartilages. The uppermost and smallest of these cartilages is placed over the *glottis* or mouth of the larynx, and is called *epiglottis*; which has been before spoken of, as closing the passage to the lungs in the act of swallowing. The sides of the larynx are composed of the *arytenoide* cartilages, which are of a very complex figure, not easy to be described. The anterior and larger part of the larynx is made up of two cartilages; one of which is called *thyroides*, or *scutiformis*, from its being shaped like a buckler; and the other *cricoides*, or *annularis*, from its resembling a ring. Both these cartilages may be felt immediately under the skin, in the fore-part of the throat; and the *thyroides*, by its convexity, forms an eminence called *pomum adamii*, which is usually more considerable in the male than in the female subject.

b, All these cartilages are united to each other by means of very elastic, ligamentous fibres; and are enabled, by the assistance of several muscles, to dilate or contract the passage of the larynx, and to perform that variety of motion which seems to point out the larynx as being the principal organ of the voice; for when the air passes out through a wound in the trachea, it produces no sound.

c, These cartilages are moistened by a mucus, which seems to be secreted by minute glands situated near them. The upper part of the trachea, and the cricoid and thyroid cartilages, are in some measure covered anteriorly by a considerable body, which is supposed to be of a glandular structure, and from its situation is called the *thyroid gland*; though its excretory duct has not yet been discovered, or its real use ascertained.

d, The inside of the glottis is covered by a very fine membrane, which is moistened by a constant supply of watery lymph. From the larynx, the canal begins to take the name of *trachea*, or *aspera arteria*; and extends from thence as far down as the fourth or fifth vertebra of the back, where it divides into two branches, which are the right and left bronchial tube. Each of these *bronchi* ramifies through the substance of that lobe of the lungs, to which it is distributed, by an infinite number of branches, which are formed of cartilages separated from each other, like those of the trachea, by an intervening membranous and ligamentary substance. Each of these cartilages is of an angular figure; and as they become gradually less and less in their diameter, the lower ones are in some measure received into those above them, when the lungs, after being inflated, gradually collapse by the air being pushed out from them in expiration. As the branches of the bronchi become more minute, their cartilages become more and more angular and membranous, till at length they are found to be perfectly membranous, and at last become invisible.

e, The trachea is furnished with fleshy or muscular fibres, some of which pass through its whole extent longitudinally, while the others are carried round it in a circular direction; so that, by the contraction or relaxation of these fibres, it is enabled to shorten or lengthen itself, and likewise to dilate or contract the

diameter of its passage.

f, The trachea, and the bronchi, in all their ramifications, are furnished with very minute glands, which discharge a pellucid lymph on the inner surface of these tubes.

g, The trachea appears to be formed with infinite wisdom for the uses it is intended to serve. Its cartilages, by keeping it constantly open, afford a free passage to the air, which we are obliged to be incessantly respiring; and its membranous part, by being capable of contraction and dilatation, enables us to receive and expel the air in a greater or less quantity, and with more or less velocity, as may be required in singing or in declamation.

h, The generality of anatomists describe the trachea as being simply membranous at its posterior part, that it may give way to the aliment as it descends through the *œsophagus*, and not impede its passage; as it would be liable to do, if the trachea was cartilaginous here, as it is in the sides and fore-part (z). But there are arguments brought to prove that this is not its use; and these are, That the *œsophagus*, as Mr Winslow observes, does not descend immediately behind it, but somewhat laterally to the left: that the bronchi, at their upper part, are likewise simply membranous posteriorly where the *œsophagus* no longer accompanies them: and that it would perhaps be dangerous if the trachea was permitted to give way to the aliment in its descent; as the respiration would be by this means impeded, and this function seems to be too essential to life to be exposed to any such interruption.

i, The trachea receives its arteries from the carotids, and its veins pass into the jugulars; its nerves arise from the recurrent and from the cervical plexus.

CHAP. VI.

Of the LUNGS.

a, The lungs fill the greater part of the cavity of the breast. They are of a soft and spongy texture; and are divided into two lobes, which are separated from each other by the mediastinum, and are externally covered by a production of the pleura. Each of these is divided into two or three lesser lobes; and we commonly find three in the right side of the cavity, and two in the left.

b, To discover the structure of the lungs, it is required to follow the ramifications of the bronchi, which were described in the last section. These becoming gradually more and more minute, at length terminate in the cellular spaces or vesicles, which make up the greatest part of the substance of the lungs, and readily communicate with each other.

c, The mucus, which was mentioned as passing into the bronchi, constitutes what we expectorate; and the most frequent cause of cough, seems to depend on the abundance or the tenacity of this secretion. Every thing we throw off by hawking or spitting, is derived either from the lungs, the nostrils, or the salivary glands; and, on the contrary, all that we bring up by vomiting comes from the stomach.

d, The lungs receive nerves from the intercostals, but

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(z) The first of these opinions appears now to be the most generally adopted; for although the membranous structure of the trachea and bronchi may assist in shortening the canal, yet it seems likewise to assist in the descent of the food.

chiefly from the eighth pair or par vagum. This last pair, having reached the thorax, sends off a branch on each side of the trachea, called the *recurrent*; which re-ascend, and go to distribute themselves to the larynx and its muscles, and likewise to the oesophagus.

e, There are two series of arteries which carry blood to the lungs: these are the *arterie bronchiales Ruysschii*, and the pulmonary artery.

f, The *arterie bronchiales* begin usually by two branches; one of which commonly arises from the intercostal, and the other from the trunk of the aorta: but sometimes there are three of these arteries, and in some subjects only one. The use of these arteries is to serve for the nourishment of the lungs, and their ramifications are seen creeping every where on the branches of the bronchi. The blood is brought back from them by the bronchial vein into the vena azygos.

g, The pulmonary artery and vein are not intended for the nourishment of the lungs; but the blood in its passage through them is destined to undergo some changes, or to acquire certain essential properties (probably from the action of the air), which it has lost in its circulation through the other parts of the body. The pulmonary artery receives the blood from the right ventricle of the heart; and dividing into two branches, accompanies the bronchi every where, by its ramifications through the lungs; and the blood is afterwards conveyed back by the pulmonary vein, which gradually forming a considerable trunk, goes to empty itself into the left ventricle of the heart; so that the quantity of blood which enters into the lungs, is perhaps greater than that which is sent in the same proportion of time, through all the other parts of the body.

CHAP. X.

Of the PERICARDIUM, and of the HEART and its AURICLES.

385, [395.]
Pericardium.

a, THE two membranous bags of the pleura, which were described as forming the mediastinum, recede one from the other, so as to form a complete sac, in which the heart is securely lodged; and this sac is the *pericardium* (c), which appears to be composed of two tunics, united to each other by cellular membrane: the outer coat is a production of the mediastinum; and the inner tunic appears to adhere to the great vessels of the heart, on which it gradually disappears.

b, This bag is attached to the tendinous part of the diaphragm, and contains a coagulable lymph, the *liquor pericardii*, which serves to lubricate the heart and facilitate its motions, and is probably secreted and absorbed in the same manner as it is in the other cavities of the body.

c, The arteries of the pericardium are derived from the phrenic, and its veins pass into veins of the same name; its nerves are likewise branches of the phrenic.

d, The size of the pericardium is adapted to that of the heart, being usually large enough to contain it loosely. As its cavity does not extend to the sternum, the lungs cover it in inspiration; and as it every where invests the heart, it effectually secures it from being in-

jured by lymph, pus, or any other fluid, extravasated into the cavities of the thorax.

a, The heart is a hollow muscle of a conical shape, situated transversely between the two laminae of the mediastinum, at the lower part of the thorax; having its *basis* turned towards the right side, and its point or *apex* towards the left. Its lower surface is somewhat flattened where it is attached to the diaphragm. Its basis, from which the great vessels originate, is covered with fat; and has two hollow and fleshy appendages, called the *auricles*. Round these several openings, the heart seems to be of a firm, ligamentous texture, from which all its fibres seem to originate; and as they advance from thence towards the apex, the substance of the heart seems to become thinner.

b, The heart includes two cavities, or *ventricles*, which are separated from each other by a fleshy septum: one of these is called the *right*, and the other the *left ventricle*; though perhaps with respect to their situation, it would be more proper to distinguish them into the *anterior* and *posterior ventricles*.

c, The outside of the heart is covered by a very fine membrane; and its structure is perfectly muscular or fleshy, being composed of fibres which are described as passing in different directions; some as being extended longitudinally from the basis to the apex; others, as taking an oblique or spiral course; and a third sort, as being placed in a transverse direction. Within the two ventricles we observe several furrows, and there are likewise tendinous strings, which arise from fleshy *columnae* in the two cavities, and are attached to the valves of auricles. That the use of these and of the other valves of the heart may be understood, it must be observed, that four large vessels pass out from the basis of the heart, *viz.* two arteries and two veins; and that each of these vessels is furnished with a thin membranous production, which is attached all round to the borders of their several orifices, from whence hanging loosely down, they appear to be divided into two or three distinct portions. But as their uses in the arteries and veins are different, so are they differently disposed. Those of the arteries are intended to give way to the passage of the blood into them from the ventricles, but to oppose its return: and on the contrary, the valves of the veins are constructed so as to allow the blood only to pass into the heart. In consequence of these different uses, we find the valves of the pulmonary artery and of the aorta attached to the orifices of those vessels, so as to have their concave surfaces turned towards the artery; and their convex surfaces, which mutually meet together, being placed towards the ventricle, only permit the blood to pass one way, which is into the arteries. There are usually three of these valves belonging to the pulmonary artery, and as many to the aorta, and from their figure they are called *valvulae semilunares*. The communication between the two great veins and the ventricles, is by means of the two appendages or auricles into which the blood is discharged; so that the other valves, which may be said to belong to the veins, are placed in each ventricle, where the auricle opens into it. The valves
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(f) The pericardium, though placed between the two laminae of the mediastinum, appears to be a distinct bag, very different in its structure from the pleura, being of a firm and somewhat tendinous complexion.

in the right ventricle are usually three in number, and are named *valvule tricuspidæ*; but in the left ventricle we commonly observe only two, and these are the *valvule mitralis*. The membranes which form these valves in each cavity are attached to as to project somewhat forward; and both the *tricuspidæ* and the *mitralis* are connected with the tendinous fringes which were described as arising from the fleshy *columnæ*. By the contraction of either ventricle, the blood is driven into the artery which communicates with that ventricle; and these tendinous fringes being gradually relaxed, as the sides of the cavity are brought nearer to each other, the valves naturally close the opening into the auricle, and the blood necessarily directs its course into the then only open passage, which is into the artery: but after this contraction, the heart becomes relaxed; the tendinous fringes are again stretched out; and drawing the valves of the auricle downwards, the blood is poured by the veins into the ventricle; from whence, by another contraction, it is again thrown into the artery, as will be described hereafter. The right ventricle is not quite so long, though somewhat larger than the left, but the latter has more substance than the other; and this seems to be because it is intended to transmit the blood to the most distant parts of the body, whereas the right ventricle distributes it only to the lungs.

d, The heart receives its nerves from the *par vagum* and the intercostals. The arteries which serve for its nourishment are two in number, and arise from the aorta. They surround in some measure the basis of the heart, and from this course are called the *coronary arteries*. From these arteries the blood is returned by veins of the same name into the auricles, and even into the ventricles.

e, The muscular bags called the *auricles* are situated at the basis of the heart, by the sides of each other; and, corresponding with the two ventricles, are, like those two cavities, distinguished into *right* and *left*. These sacs, which are interiorly unequal, have externally a jagged appendix, which, from its having been compared to the extremity of an ear, has given them their name of *auricles*.

CHAP. XI.

Description of the BLOOD-VESSELS.

387

a, THE heart has been described as contracting itself, and throwing the blood from its two ventricles into the pulmonary artery and the aorta; and then as relaxing itself, and receiving a fresh supply from two large veins, which are the pulmonary veins, and the *vena cava*. We will now point out the principal distributions of these vessels.

b, The pulmonary artery arises from the right ventricle by a large trunk, which soon divides into two considerable branches, which pass to the right and left lobes of the lungs: each of these branches is afterwards divided and subdivided into an infinite number of branches and ramifications, which extend through the whole substance of the lungs; and from these branches the blood is returned by the veins, which, conti-

nary to the course of the arteries, begin by very minute canals, and gradually become larger, forming at length four large trunks called the *pulmonary veins*, which terminate in the *left auricle* by one common opening, from whence the blood passes into the *left ventricle*. From this same ventricle arises the *aorta*, or *great artery*, which at its beginning is nearly an inch in diameter. It soon sends off two branches, the *coronaries*, which go to be distributed to the heart and its auricles. After this, at or about the third or fourth vertebra of the back, it makes a considerable curvature. From this curvature (c) arise three arteries; one of which soon divides into two branches. The first two are the left subclavian, and the left carotid; and the third is a common trunk to the right subclavian and right carotid; though sometimes both the carotids arise distinctly from the aorta.

c, The two *carotids* ascend within the subclavians, along the sides of the trachea; and when they have reached the larynx, divide into two principal branches the *internal* and *external carotid*. The first of these runs a little way backwards in a bending direction; and, having reached the under part of the ear, passes through the canal in the *os petrosum*, and entering into the cavity of the cranium is distributed to the brain and the membranes which envelope it. The *external carotid* divides into several branches, which are distributed to the larynx, pharynx, and other parts of the neck, and to the jaws, lips, tongue, eyes, temples, and all the external parts of the head.

d, Each *subclavian* is likewise divided into a great number of branches. It sends off the *vertebral artery*, which passes through the openings we see at the bottom of the transverse processes of the vertebrae of the neck, and in its course sends off many ramifications to the neighbouring parts. Some of its branches are distributed to the spinal marrow; and, after a considerable inflection, it enters into the cranium, and is distributed to the brain. The *subclavian* likewise sends off branches to the muscles of the neck and scapula: and the mediastinum, thymus, pericardium, diaphragm, the breasts, and the muscles of the thorax, and even of the abdomen, derive branches from the subclavian; which are distinguished by different names, alluding to the parts to which they are distributed, as the *mammary*, the *phrenic*, the *intercostal*, &c. But, notwithstanding the great number of branches which have been described as arising from the subclavian, it is still a considerable artery when it reaches the *axilla*, where it drops its former name, which alluded to its passage under the clavicle, and is called the *axillary artery*; from which a variety of branches are distributed to the muscles of the breast, scapula, and arm. But its main trunk taking the name of *brachialis*, runs along within the arm near the *os humeri*, till it reaches the joint of the fore-arm, and then it divides into two branches. This division, however, is different in different subjects; for in some it takes place higher up, and in others lower down. When it happens to divide above the joint, it may be considered as a happy disposition in case of an accident by bleeding; for supposing the artery to be unfortunately punctured by the lancet,

(c) Anatomists usually call the upper part of this curvature, *aorta ascendens*; and the other part of the artery to its division at the iliacs, *aorta descendens*: but they differ about the place where this distinction is to be introduced; and it seems sufficiently to answer every purpose, to speak only of the aorta and its curvature.

lancet, and that the hemorrhage could only be stopt by making a ligature on the vessel, one branch would remain unhurt, through which the blood would pass uninterrupted to the fore arm and hand. One of the two branches of the *brachialis* plunges down under the flexor muscles, and runs along the edge of the ulna; while the other is carried along the outer surface of the radius, and is easily felt at the wrist, where it is only covered by the common integuments. Both these branches commonly unite in the palm of the hand, and form an arterial arch from whence branches are detached to the fingers.

c, The *aorta*, after having given off at its curvature the *carotids* and *subclavians*, which convey blood to all the upper parts of the body, descends upon the bodies of the vertebrae a little to the left, as far as the *os sacrum*, where it drops the name of *aorta*, and divides into two considerable branches. In this course, from its curvature to its bifurcation, it sends off several arteries, in the following order.

f, 1. Two little arteries, and sometimes only one, first demonstrated by Ruysch as going to the bronchi, and called *arterie bronchiales Ruyschii*. 2. The *inferior, intercostal arteries* which are distributed between the ribs in the same manner as the arteries of the three or four superior ribs are, which are derived from the subclavian. These arteries send off branches to the medulla spinalis. 3. The *phrenic*, which goes to the diaphragm, and the arteries which are distributed to the *œsophagus*. 4. The *celiac*, which arises from the *aorta*, under the diaphragm, and is distributed to the stomach, omentum, duodenum, pancreas, spleen, liver, and gall-bladder. 5. The *superior mesenteric artery*, which is distributed to the mesentery and small intestines. 6. The *emulgenti*, which go to the kidneys. 7. The arteries which are distributed to the *glandule renales*. 8. The *spermatic*. 9. The *inferior mesenteric artery*, which ramifies through the lower portion of the mesentery and the large intestines. A branch of this artery which goes to the rectum is called the *internal hemorrhoidal*. 10. The lumbar arteries, and a very small branch called the *sacra*; which are distributed to the muscles of the loins and abdomen, and to the *os sacrum* and medulla spinalis.

g, The trunk of the *aorta*, when it has reached the last vertebra lumborum, or the *os sacrum*, drops the name of *aorta*, and separates into two forked branches, called the *iliacæ*. Each of these soon divides into two branches; one of which is called the *internal iliac*, or *hypogastric artery*; and is distributed to the urinary bladder, intestinum rectum, and the neighbouring parts. That branch which goes to the rectum is called the *external hemorrhoid*. The *external iliac*, after having given off the *umbilical artery*, and the *epigastric*, which is distributed to the recti muscles, passes out of the abdomen, under Poupart's ligament, and takes the name of *crural artery*. It descends on the inner part of the thigh close to the *os femoris*, sending off branches to the muscles; and then sinking deeper in the hind part of the thigh, reaches the ham, where it takes the name of *popliteal*. After this it separates into two considerable branches; one of which is called the anterior tibial artery; the other divides into two branches; and these

arteries all go to be distributed to the leg and foot.

h, The blood, which is thus distributed by the *aorta* to all parts of the body, is brought back by the veins, which are supposed to be continued from the ultimate branches of arteries, and, uniting together as they approach the heart, at length form two large trunks, the *vena cava ascendens* and *vena cava descendens*.

i, All the veins which bring back the blood from the upper extremities, and from the head and breast, pass into the *vena cava descendens*; those which return it from the lower parts of the body, terminate in the *vena cava ascendens*; and these two *cavas*, uniting together as they approach the heart, open by one common orifice into the left auricle.

k, It does not here seem to be necessary to follow the different divisions of the veins as we did those of the arteries; and it will be sufficient to remark, that, in general, every artery is accompanied by its vein, and that both are distinguished by the same name. But like many other general rules, this too has its exceptions (n). The veins, for instance, which accompany the external and internal *carotid*, are not called the *carotid veins*, but the *external and internal jugular*. In the thorax there is a vein distinguished by a proper name, and this is the *axillæ* or *vena sine pari*. This vein, which is a pretty considerable one, runs along by the right side of the vertebrae of the back, and is chiefly destined to receive the blood from the intercostals on that side, and to convey it into the *vena cava descendens*. In the abdomen, we meet with a vein which is still a more remarkable one; and this is the *vena porta*, which performs the office both of an artery and a vein. It is formed by a reunion of all the veins which come from the stomach, intestines, omentum, pancreas, and spleen, so as to compose one great trunk, which goes to ramify through the liver; and after having deposited the bile, its ramifications unite and bring back into the *vena cava*, not only the blood which the *vena porta* had carried into the liver, but likewise the blood from the hepatic artery. Every artery has a vein which corresponds with it; but the trunks and branches of the veins are more numerous than those of the arteries. The reasons for this disposition are perhaps not difficult to be explained. The blood, in its course through the veins, is much farther removed from the source and cause of its motion which are in the heart, than it was when in the arteries: so that its course is consequently less rapid, and enough of it could not possibly be brought back to the heart, in the moment of its dilatation, to equal the quantity which is driven into the arteries from the two ventricles at the time they contract; and the equilibrium, which is so essential to the continuance of life and health, would consequently be destroyed if the capacity of the veins did not exceed that of the arteries, in the same proportion that the rapidity of the blood's motion through the arteries exceeds that of its return through the veins.

l, A large artery ramifying through the body, and continued to the minute branches of veins, which gradually unite together to form a large trunk, may be compared to two trees united to each other at their tops; or rather as having their ramifications so disposed, that the two trunks terminate in one common point: and

if

(n) In the extremities, some of the deep seated veins, and all the superficial ones, take a course different from that of the arteries.

if we farther suppose that both these trunks and their branches are hollow, and that a fluid is incessantly circulated through them, by entering into one of the trunks and returning through the other, we shall be enabled to conceive how the blood is circulated thro' the vessels of the human body.

m, Every trunk of an artery, before it divides, is nearly cylindrical, or of equal diameter thro' its whole length, and so are all its branches when examined separately. But every trunk seems to contain less blood than the many branches do into which that trunk separates; and each of these branches probably contains less blood than the ramifications do into which it is subdivided: And it is the same with the veins; the volume of their several ramifications, when considered together, being found to exceed that of the great trunk which they form by their union.

n, The return of the blood through the veins to the heart is promoted by the action of the muscles and the pulsation of the arteries. This return is likewise greatly assisted by the *valves* which are to be met with in the veins, and which constitute one of the great distinctions between them and the arteries. These valves (1), which are supposed to be formed by the inner coat of the veins, permit the blood to flow from the extremities towards the heart, but oppose its return.

o, Both the arteries and veins are membranous canals which are composed of three tunics (κ); and even the most minute branches of both these series of vessels are nourished by still more minute arteries and veins, which are seen creeping over their coats, and ramifying through their whole substance, and are called *vasa vasorum*: they have likewise many minute branches of nerves.

p, The arteries are much stronger than the veins; and they seem to require this force to be enabled to resist the impetus with which the blood circulates thro' them, and to impel it on towards the veins.

q, When the heart contracts, it impels the blood into the arteries, and sensibly distends them; and these vessels again contract, as the heart becomes relaxed to receive more blood from the auricles. So that the cause of the contraction and dilatation of the *arteries*, seems to be easy to be understood, being greatly dependent on the motion of the heart: but, in the *veins*, where the effects of this impulse are not so sensibly felt, the blood seems to flow in a constant and equal stream; and this, together with its passing gradually from a

small channel into a larger one, seems to be the reason why the *veins* have no pulsatory motion (l).

CHAP. XII.

Of the Action of the HEART, AURICLES, and ARTERIES.

a, The heart, at the time it contracts, drives the blood from its ventricles into the arteries; and the arteries, being thus filled and distended, are naturally inclined to contract, the moment the heart begins to dilate, and ceases to supply them with blood. These alternate motions of contraction and dilatation of the heart and arteries are distinguished by the names of *systole* and *diastole*. When the heart is in a state of contraction or *systole*, the arteries are at that instant distended with blood and in their *diastole*; and it is in this state we feel their pulsatory motion, which we call the *pulse*. When the heart dilates, and the arteries contract, the blood is impelled onwards into the veins, thro' which it is returned back into the heart. While the heart, however, is in its *systole*, the blood cannot pass from the veins into the ventricles; but is detained in the auricles, which are two reservoirs formed for this use, till the *diastole* or dilatation of the heart takes place; and then the distended auricles contract, and drive the blood into the ventricles: so that the auricles have an alternate *systole* and *diastole*, as well as the heart.

b, Altho' both the ventricles of the heart contract at the same time, yet the blood passes from one to the other. In the same moment, for instance, that the left ventricle drives the blood into the aorta; the right ventricle impels it into the pulmonary artery, which is distributed through all the substance of the lungs. The blood is afterwards brought back into the left ventricle by the pulmonary vein, at the same time that the blood is returned by the *cavas*, into the right ventricle, from all the other parts of the body.

c, This seems to be the mode of action of the heart and its vessels: but the cause of this action, has like all other intricate and interesting subjects, been differently explained; often with much ingenuity, though perhaps not yet with sufficient certainty to be established as a physical truth. It is probably occasioned by the influence of the *nerves*, excited in consequence of an impression made on the heart by the blood itself, which by its quantity and heat (m), or other properties (n), is perhaps capable of first exciting that motion,

(i) The valves are most frequent in the smaller veins. As the column of blood is increased, they seem to become less necessary; and, therefore in the *vena cava* ascendens we meet with only one valve, which is near its origin.

(κ) There are writers who describe the arteries as having five tunics; while others speak only of four; and many will allow them only three, which are the *nervous*, *muscular*, and *cucular tunics*. The *veins* are by many writers supposed to consist of the same number of coats as the *arteries*; but that, by being thinner, they do not easily admit of separation. That they have no muscular coat, however, seems now to be pretty generally allowed; and there are eminent anatomists who contend, (and seemingly with good reason), that no muscular fibres are to be demonstrated even in the coats of arteries.

(l) Many modern writers allow, that there is a pulsatory motion in the great veins near the heart; but it there seems to be occasioned by the motion of the diaphragm, and by the regurgitation of the blood in the *cavas*.

(m) Dr Hales observed, that the pulse is quicker in small animals, than in large ones; and this seems to be, because their heat is proportionally greater. The velocity of the blood's motion seems likewise to depend on the greater or less degree of irritability of the body through which it circulates. In people of weak habits, it is constantly more rapid than in robust subjects. In new-born infants, the pulse usually beats 120. As we approach to old age, and the irritability of the body decreases, it gradually becomes slower; and in advanced life, is found to beat only 60, 50, or 40, and sometimes not so often, in a minute.

(n) Dr Harvey long ago suggested, that the blood is possessed of a living principle; and Mr J. Hunter has lately endeavoured to revive this doctrine, in support of which he has adduced many ingenious arguments. The subject is a curious one, and deserves to be prosecuted as an inquiry which cannot but be interesting to physiologists.

tion, which is afterwards continued through life, independent of the will, by a regular return of blood to the auricles in a quantity proportioned to that which is thrown into the arteries.

CHAP. XIII.

Of the CIRCULATION.

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a, AFTER what has been observed of the structure and action of the heart and its auricles, and likewise of the arteries and veins; there seem to be but very few arguments required to demonstrate the *circulation of the blood*, which has been long since established as a medical truth. This circulation may be defined to be a perpetual motion of the blood, in consequence of the action of the heart and arteries, which impel it thro' all the parts of the body, from whence it is brought back by the veins to the heart (o).

b, A very satisfactory proof of this circulation, and a proof easy to be understood, may be deduced from the different effects of pressure on an artery and a vein. If a ligature, for instance, is passed round an artery, the vessel swells considerably between the ligature and the heart; whereas, if we tie up a vein, it only becomes filled between the extremity and the ligature: and this is what we every day observe in bleeding. The ligature we pass round the arm on these occasions compresses the superficial veins; and, the return of the blood thro' them being impeded, they become distended. When the ligature is too loose, the veins are not sufficiently compressed, and the blood continues its progress towards the heart; and on the contrary, when it is made too tight, the arteries themselves become compressed, and the flow of blood through them being impeded, the veins cannot be distended.

c, Another phenomenon which effectually proves the circulation, is the loss of blood that every living animal sustains by opening only a single artery of a moderate size; for it continues to flow from the wounded vessel till the equilibrium is destroyed which is essential to life. This truth was not unknown to the ancients; and it seems strange that it did not lead them to a knowledge

of the circulation, as it sufficiently proves that all the other vessels must communicate with that which is opened. Galen, who lived more than 1500 years ago, drew this conclusion from it; and if we farther observe, that he describes (after Erasistratus who flourished about 450 years before him) the several valves of the heart, and determines their disposition and uses, it will appear wonderful, that a period of near 2000 years should afterwards elapse before the true course of the blood was ascertained. This discovery, for which we are indebted to the immortal Harvey, has thrown new lights on physiology and medicine, and constitutes one of the most important periods of anatomical history.

CHAP. XIV.

Of the Nature of the BLOOD.

a, BLOOD recently drawn from a vein into a basin, would seem to be an homogeneous fluid of a red colour (p); but, when suffered to rest, it soon coagulates, and divides into two parts, which are distinguished by the names of *crassamentum* and *serum*. The *crassamentum* is the red coagulum, and the *serum* is the water in which it floats.

b, Each of these may be again separated into two others. For the *crassamentum*, by being repeatedly washed in warm water, gives out all its red globules; and what remains appears to be composed of the *coagulable lymph* (q), which is a gelatinous substance, capable of being hardened by fire till it becomes perfectly horny: and if we expose the *serum* to a certain degree of heat, part of it will be found to coagulate like the white of an egg, and there will remain a clear and limpid water, resembling urine both in its appearance and smell. The most remarkable property of the *serum* is its being pervious to the common air. See AIR, n° 48.

c, The *serum* and *crassamentum* differ in their proportion in different constitutions; in a strong person the *crassamentum* is in a greater proportion to the *serum*, than in a weak one; and the same difference is found to take place in diseases (r).

EXPLANATION OF PLATES XVII. XIX. XX.

PLATE XVII.

This plate represents the heart in situ, all the large arteries and veins, with some of the muscles, &c.

MUSCLES, &c.—SUPERIOR EXTREMITY.—a, Malleter. b, Complexus. c, Digastricus. d, Os hyoides. e, Thyroid gland. f, Levator scapulae. g, Cucullaris. h h, The clavicles cut. i, The deltoid muscle. k, Biceps

(o) The motion of the blood, and its passage from the arteries into the veins, may be perceived, with the assistance of a microscope, in the tails of fishes and in frogs.

(p) The blood, as it flows through the arteries, is observed to be more florid than it is in the veins; and this redness seems to be required in its passage through the lungs.

(q) It may not be improper to observe, that till of late the *coagulable lymph* has been confounded with the *serum* of the blood, which contains a substance that is likewise coagulable though only when exposed to heat, or certain chemical substances, whereas the other coagulates spontaneously when exposed to the air or to rest.

(r) When the blood separates into *serum* and *crassamentum*, if the latter be covered with a crust of a whitish or buff colour, it has been usually considered as a certain proof of the blood's being in a state of too great viscosity. This appearance commonly taking place in inflammatory diseases, has long served to confirm the theory which ascribes the cause of inflammations to lentor and obstructions. But Dr Fordyce accounts in a different manner for the formation of the buff. He asserts, that when the action of the arteries is increased, the blood, instead of being more viscid, is on the contrary more fluid, than in the ordinary state, previous to inflammation: and that, in consequence of this, the *coagulable lymph* suffers the red globules, which are the heaviest part of the blood, to fall down to the bottom before it coagulates: so that the *crassamentum* is divided into two parts; one of which is found to consist of the coagulable lymph alone, (in this case termed the *buff*); and the other, partly of this and partly of the red globules.

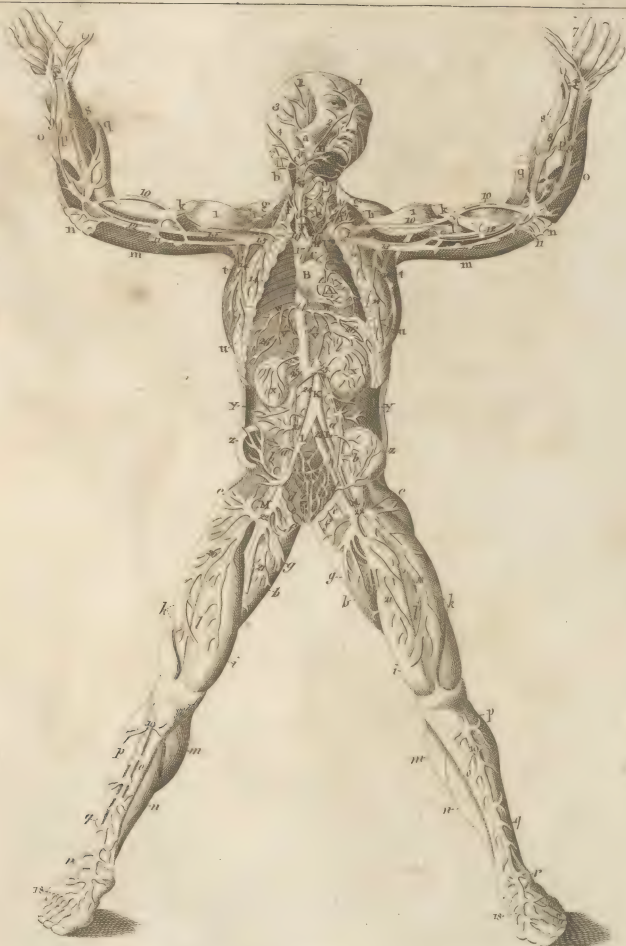


Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

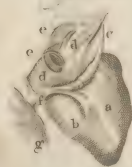
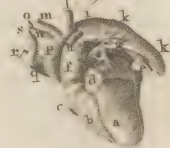


Fig. 5.





k, Biceps flexor cubiti cut. *l*, Coraco-brachialis. *m*, Triceps extensor cubiti. *n*, The head of the pronator teres, flexor carpi radialis, and flexor digitorum sublimis, cut. *o*, The flexor carpi ulnaris, cut at its extremity. *p*, Flexor digitorum profundus. *q*, Supinator radii longus, cut at its extremity. *r*, Ligamentum carpi transversale. *s*, Extensor carpi radiales. *t*, Latissimus dorsi. *u*, Anterior edge of the serratus anticus major. *v*, *v*, The inferior part of the diaphragm. *w*, *w*, Its anterior edge cut. *x*, *x*, The kidneys. *y*, Transversus abdominis. *z*, *z*, Ilium.

INFERIOR EXTREMITY.—*a*, Psoas magnus. *b*, Iliacus internus. *c*, The fleshy origin of the tensor vaginæ femoris. *d*, *d*, The ossa pubis cut from each other. *e*, Muculus pectineus cut from its origin. *f*, Short head of the triceps adductor femoris cut. *g*, The great head of the triceps. *h*, The long head cut. *i*, Vastus internus. *k*, Vastus externus. *l*, Crureus. *m*, Gemellus. *n*, Soleus. *o*, Tibia. *p*, Peronæus longus. *q*, Peronæus brevis. *r*, Fibula.

HEART AND BLOOD-VESSELS.—*A*, The heart, with the coronary arteries and veins. *B*, The right auricle of the heart. *C*, The aorta ascendens. *D*, The left subclavian artery. *E*, The left carotid artery. *F*, The common trunk which sends off the right subclavian and right carotid arteries. *G*, The carotis externa. *H*, Arteria facialis, which sends off the coronary arteries of the lips. *I*, Arteria temporalis profunda. *K*, Aorta descendens. *L*, *L*, The iliac arteries, which send off *M*, *M*, The femoral or crural arteries. *N. B.* The other arteries in this figure have the same distribution as the veins of the same name:—And generally, in the anatomical plates, the description to be found on the one side, points out the same parts in the other. 1, The frontal vein. 2, The facial vein. 3, Vena temporalis profunda. 4, Vena occipitalis. 5, Vena jugularis externa. 6, Vena jugularis interna, covering the arteria carotis communis. 7, The vascular arch on the palm of the hand, which is formed by 8, the radial artery and vein, and 9, the ulnar artery and vein. 10, Cephalic vein. 11, Basilic vein, that on the right side, cut. 12, Median vein. 13, The humeral vein, which, with the median, covers the humeral artery. 14, 14, The external thoracic or mammary arteries and veins. 15, The axillary vein, covering the artery. 16, 16, The subclavian veins, which, with (6 6) the jugulars, form, 17, The vena cava superior. 18, The cutaneous arch of veins on the fore-part of the foot. 19, The vena tibialis antica, covering the artery. 20, The vena profunda femoris, covering the artery. 21, The upper part of the vena saphena major. 22, The femoral vein. 23, 23, The iliac veins. 24, 24, Vena cava inferior. 25, 25, The renal veins covering the arteries. 26, 26, The diaphragmatic veins.

PLATE XIX.

FIGURE 1. Shews the contents of the thorax and abdomen in situ.

1, Top of the trachea, or wind-pipe. 2, 2, The internal jugular veins. 3, 3, The subclavian veins. 4, The vena cava descendens. 5, The right auricle of the heart. 6, The right ventricle. 7, Part of the left ventricle. 8, The aorta ascendens. 9, The pulmonary artery. 10, The right lung, part of which is cut.

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off to shew the great blood-vessels. 11, The left lung entire. 12, 12, The anterior edge of the diaphragm. 13, 13, The two great lobes of the liver. 14, The ligamentum rotundum. 15, The gall-bladder. 16, The stomach. 17, 17, The jejunum and ilium. 18, The spleen.

FIG. 2. Shews the organs subservient to the chylipoietic viscera,—with those of urine and generation.

1, 1, The under side of the two great lobes of the liver. *a*, Lobulus Spigelii. 2, The ligamentum rotundum. 3, The gall-bladder. 4, The pancreas. 5, The spleen. 6, 6, The kidneys. 7, The aorta descendens. 8, Vena cava ascendens. 9, 9, The renal veins covering the arteries. 10, A probe under the spermatic vessels and a bit of the inferior mesenteric artery, and over the ureters. 11, 11, The ureters. 12, 12, The iliac arteries and veins. 13, The rectum intestineum. 14, The bladder of urine.

FIG. 3. Shews the chylipoietic viscera, and organs subservient to them, taken out of the body entire.

A, The under side of the two great lobes of the liver. *B*, Ligamentum rotundum. *C*, The gall-bladder. *D*, Ductus cysticus. *E*, Ductus hepaticus. *F*, Ductus communis choledochus. *G*, Vena portarum. *H*, Arteria hepatica. *I*, *I*, The stomach. *K*, *K*, Venæ & arteriæ gastro-epiploicæ, dextræ & sinistræ. *L*, *L*, Venæ & arteriæ coronariæ ventriculi. *M*, The spleen. *N*, *N*, Mesocolon, with its vessels. *O*, *O*, Intestinum colon. *P*, One of the ligaments of the colon, which is a bundle of longitudinal muscular fibres. *Q*, *Q*, Jejunum and ilium. *R*, *R*, Sigmoid flexure of the colon with the ligament continued, and over *S*, The rectum intestineum. *T*, *T*, Levatores ani. *U*, Sphincter ani. *V*, The place to which the prostate gland is connected. *W*, The anus.

FIG. 4. Shews the heart of a fœtus at the full time, with the right auricle cut open to shew the foramen ovale, or passage between both auricles.

a, The right ventricle. *b*, The left ventricle. *c*, *c*, The outer side of the right auricle stretched out. *d*, *d*, The posterior side, which forms the anterior side of the septum. *e*, The foramen ovale, with the membrane or valve which covers the left side. *f*, Vena cava inferior passing through *g*, A portion of the diaphragm.

FIG. 5. Shews the Heart and large vessels of a fœtus at the full time.

a, The left ventricle. *b*, The right ventricle. *c*, A part of the right auricle. *d*, Left auricle. *e*, *e*, The right branch of the pulmonary artery. *f*, Arteria pulmonalis. *g*, *g*, The left branch of the pulmonary artery, with a number of its largest branches dissected from the lungs. *h*, The canalis arteriosus. *i*, The arch of the aorta. *k*, *k*, The aorta descendens. *l*, The left subclavian artery. *m*, The left carotid artery. *n*, The right carotid artery. *o*, The right subclavian artery. *p*, The origin of the right carotid and right subclavian arteries in one common trunk. *q*, The vena cava superior or descendens. *r*, The right common subclavian vein. *s*, The left common subclavian vein.

N. B. All the parts described in this figure are to be found in the adult, except the canalis arteriosus.

C c c

PLATE

PLATE XX.

FIG. 1. Represents the under and posterior side of the bladder of urine, &c.

a, The bladder. b b, The insertion of the ureters. c c, The vasa deferentia, which convey the semen from the testicles to d d, The vesiculæ seminales,—and pass through e, The prostate gland, to discharge themselves into f, The beginning of the urethra.

FIG. 2. A transverse section of the penis.

g g, Corpora cavernosa penis. h, Corpus cavernosum urethrae. i, Urethra. k, Septum penis. ll, The septum between the corpus cavernosum urethrae, and that of the penis.

FIG. 3. A longitudinal section of the penis.

m m, The corpora cavernosa penis, divided by o, The septum penis. n, The corpus cavernosum glandis, which is the continuation of that of the urethra.

FIG. 4. Represents the female organs of generation. a, That side of the uterus which is next the os sacrum. 1, Its fundus. 2, Its cervix. b b, The Fallopian or uterine tubes, which open into the cavity of the uterus;—but the other end is open within the pelvis, and surrounded by c c, The fimbriae. d d, The ovaria. e, The os internum uteri, or mouth of the womb. f f, The ligamenta rotunda, which pass without the belly, and is fixed to the labia pudendi. g g, The cut edges of the ligamenta lata, which connects the uterus to the pelvis. h, The inside of the vagina. i, The orifice of the urethra. k, The clitoris surrounded by (l) the præputium. m m, The labia pudendi. n n, The nymphæ.

FIG. 5. Shews the spermatic ducts of the testicle filled with mercury.

A, The vas deferens. B, Its beginning, which forms the posterior part of the epididymis. C, The middle of the epididymis, composed of serpentine ducts. D, The head or anterior part of the epididymis unravelled. e e e, The whole ducts which compose the head of the epididymis unravelled. f f, The vasa deferentia. g g, Rete testis. h h, Some rectilinear ducts which send off the vasa deferentia. i i, The substance of the testicle.

FIG. 6. The right testicle entire, and the epididymis filled with mercury.

A, The beginning of the vas deferens. B, The vas deferens extended towards the abdomen. C, The posterior part of the epididymis, named *globus minor*. D, The spermatic vessels inclosed in cellular substance. E, The body of the epididymis. F, Its head, named *globus major*. G, Its beginning from the testicle. H, The body of the testicle, inclosed in the tunica albuginea.

CHAP. XV.

Of the GLANDS and SECRETIONS.

a, The glands are commonly understood to be small,

(τ) The lymphatic and mesenteric glands seem now to be considered as the only *conglobate* glands, but their use has not yet been ascertained. The vessels which pour out mucus in different parts of the body are supposed to be *simple follicles*, or small cylindrical tubes, continued from the ends of arteries. The tonsils seem to be composed of many such simple follicles folded together, in one common covering, and opening into one common sinus. It has already been observed in a former note, that it is a subject of controversy how the *liquor pericardii* is secreted, and how the vapour which moistens the pleura and pericardium is exhaled into those cavities.

roundish, or oval bodies, formed by the convolution of a great number of vessels, and destined to separate particular humours from the mass of blood.

b, They are usually divided into two classes. Of these, the single and simple glands which are to be met with in different parts of the body, and are either solitary or in distinct clusters, are called *conglobate* (τ); and the pancreas, the parotids, and other compound glands, which are of a granulated substance, and appear to be composed of lesser glands, are called *conglomerate*.

c, The principal glands, and the humours they secrete, have been already described in different parts of this treatise *; and there only remains for us to examine the general structure of the glands, and to explain the mechanism of secretion.

On the first of these subjects two different systems have been formed, each of which has had, and still continues to have, its adherents. One of these systems was advanced by Malpighi, who supposed that an artery, entering into a gland, ramifies very minutely through its whole substance; and that its branches ultimately terminate in a vesicular cavity or follicle, from whence the secreted fluid passes out through the excretory duct. This doctrine at first met with few opponents: but the celebrated Ruysch, who first attempted minute injections with wax, afterwards disputed the existence of these follicles; and asserted, that every gland appears to be a continued series of vessels, which, after being repeatedly convoluted in their course through its substance, at length terminate in the excretory duct: and this second system seems now to be the most generally adopted.

a, The mode of secretion has been explained in a variety of ways, and they are all perfectly hypothetical. In such an inquiry, it is natural to ask, how one gland constantly separates a particular humour, while another gland secretes one of a very different nature, from the blood? The bile, for instance, is separated by the liver, and the urine by the kidneys. Are these secretions to be imputed to any particular disposition in the fluids, or is their cause to be looked for in the solids?

b, It has been supposed, that every gland contains within itself a fermenting principle, by which it is enabled to change the nature of the blood it receives, and to endue it with a particular property. So that, according to this system, the blood, as it circulates thro' the kidneys, becomes mixed with the fermenting principle of those glands, and a part of it is converted into urine; and again, in the liver, in the salivary and other glands, the bile, the saliva, and other juices, are generated from a similar cause: but it seems to be impossible for any liquor to be confined in a place exposed to the circulation, without being carried away by the torrent of blood, every part of which would be equally affected; and this system of fermentation has long been rejected as vague and chimerical. But as the cause of secretion continued to be looked for in the fluids, the former system was succeeded by another, in which recourse was had to the analogy of the humours. It was observed,

* No 16—
18, 361,
378, 371,
b, n.
393
Of secretion
Structure of
the glands.

Fig. 1.

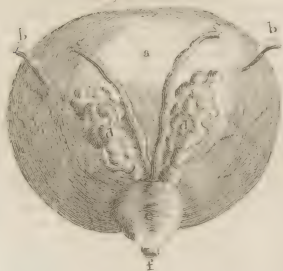


Fig. 4.

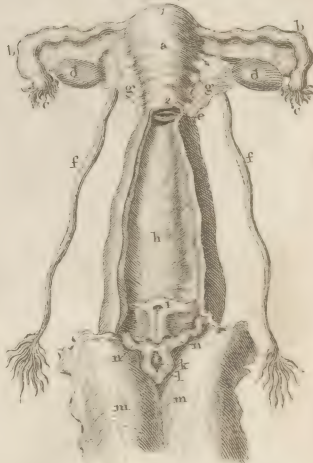


Fig. 2.

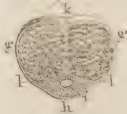


Fig. 5.

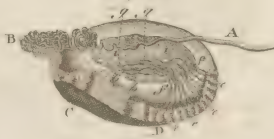
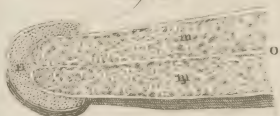


Fig. 6.



Fig. 3.





served, that if paper is moistened with water, and oil and water are afterwards poured upon it, that the water only will be permitted to pass through it. But that, on the other hand, if the paper has been previously soaked in oil instead of water, the oil only, and not the water, will be filtered through it. These observations led to a supposition, that every secretory organ is originally furnished with a humour analogous to that which it is afterwards destined to separate from the blood; and that, in consequence of this disposition, the secretory vessels of the liver, for instance, will only admit the bilious particles of the blood, while all the other humours will be excluded. This fytem is an ingenious one, but the difficulties with which it abounds are unanswerable. For oil and water are immiscible; whereas the blood, as it is circulated through the body, appears to be an homogeneous fluid. Every oil will pass through a paper moistened only with one kind of oil; and wine or spirits mixed with water will easily be filtered through a paper previously soaked in water. Upon the same principle, all our humours, though differing in their other properties, yet agreeing in that of being perfectly miscible with each other, will all easily pass through the same filtre. But these are not all the objections to this fytem. The humours which are supposed to be placed in the secretory vessels, for the determination of similar particles from the blood, must be originally separated without any analogous fluid; and that which happens once, may as easily happen always. Again, it sometimes happens, from a vicious disposi-

tion, that humours are filtered through glands which are naturally not intended to afford them a passage; and when this has once happened, it ought, according to this fytem, to be expected always to do so; whereas this is not the case, and we are after all naturally led to seek for the cause of secretion in the solids. It does not seem right to ascribe it to any particular figure of the secretory vessels; because the soft texture of those parts does not permit them to preserve any constant shape, and our fluids seem to be capable of accommodating themselves to every kind of figure. It will therefore be more reasonable to impute it to the difference of diameter in the orifices of the different secretory vessels. To this doctrine, objections will likewise be raised; and it will probably be argued, that the vessels of the liver, for instance, will, upon this principle, afford a passage not only to the bile, but to all the other humours of less consistence with it. This objection can only be answered, by supposing that secondary vessels exist, which originate from the first, and permit all the humours thinner than the bile to pass thro' them. The bile will then be completely secreted, and conveyed into the vessels destined for its reception.

c, It seems probable, that the degree of distance between the secretory organ and the heart, the convoluted course of the vessels, and the angles they form in their course thro' the glands, together with the different velocity of the blood, all contribute to dispose the humours to secretion.

PART VI. OF THE BRAIN AND ITS INTEGUMENTS, AND OF THE NERVES.

CHAP. I.

Of the BRAIN and its INTEGUMENTS.

394

THE bones of the *cranium* were described, in the osteological part, as inclosing the brain, and defending it from external injury: but they are not its only protection; for when we make an horizontal section thro' these bones, we find this mass every where surrounded by two membranes (v), the *dura* and *pia mater*.

395
Integuments
of the brain.

a, The first of these lines the interior surface of the *cranium*, to which it adheres strongly at the sutures, and at the many foramina through which vessels pass between it and the *pericranium*. The *dura mater* is perfectly smooth and inelastic; and its inner surface is constantly bedewed with a fine pellucid fluid, which every where separates it from the *pia mater*. The *dura mater* sends off several considerable processes, which divide the brain into separate portions, and prevent them from compressing each other. Of these processes there is one superior and longitudinal, called the *falk* or *salciform process*, from its resemblance to a fythe. It arises from the spine of the *os frontis*, near the crista galli, and extending along in the direction of the sagittal suture, to beyond the lambdoidal suture, divides the brain into two hemispheres. A little below the lambdoidal suture, it divides into two broad wings or

expansions, called the *transverse* or *lateral processes*, which prevent the lobes of the cerebrum from pressing on the cerebellum. Besides these there is a fourth, which is situated under the transverse processes, and, being continued to the spine of the occiput, divides the cerebellum into two lobes.

b, The blood, after being distributed through the cavity of the *cranium* by means of the arteries, is returned as in the other parts of the body by veins which all pass on to certain channels situated behind these several processes.

c, These canals or sinuses communicate with each other, and empty themselves into the internal jugular veins, which convey the blood into the *vena cava*. They are in fact triangular veins, and like the processes are distinguished into *longitudinal* and *lateral*; and where these three meet, and where the fourth passes off, we observe a fourth sinus, which is called *torcular*; Herophilus, who first described it, having supposed that the blood at the union of these two veins is as it were in a press. Within the sinuses we observe minute filaments, the *chorda Willisii*, which seem to add to their strength, and prevent their being too much dilated.

d, The *pia mater* is a much tenderer and finer membrane than the *dura mater*; being exceedingly delicate and vascular. It invests every part of the brain

C c c 2 and

(v) The Greeks call these membranes, *meninges*; but the Arabians, supposing them to be the source of all the other membranes of the body, afterwards gave them the names of *dura* and *pia mater*, by which they are now usually distinguished.

and sends off an infinite number of elongations, which insinuate themselves between the convolutions, and even into the substance of the brain. This membrane is usually described as being composed of two laminæ, of which the exterior one is named *tunica arachnoides*, from its supposed resemblance to a spider's web.

396
The brain.

There are several parts included under the general denomination of *brain*. One of these, which is of the softest consistence, and fills the greatest part of the cavity of the cranium, is the *cerebrum*, or *brain properly so called*; another portion, which is seated in the inferior and posterior part of the head, is the *cerebellum*; and a third, which derives its origin from both these, is the *medulla oblongata*.

397
Cerebrum.

a, The *cerebrum* is a medullary mass of a moderate consistence, filling up exactly all the superior part of the cavity of the cranium, and divided into two hemispheres by the *falx* of the dura mater. Each of these hemispheres is distinguished into an *anterior*, a *middle* and a *posterior* lobe. The first of these is lodged on the orbital processes of the *os frontis*; the middle lobes lie in the middle of the fossæ of the basis of the cranium; and the posterior lobes are placed on the transverse septum of the *os occipitis*, immediately over the *cerebellum*, from which they are separated by the lateral processes of the dura mater.

b, The *cerebrum* appears to be composed of two distinct substances. Of these the exterior one, which is of a greyish or ash-colour, is called the *cortex*, and is somewhat softer than the other, which is very white, and is called *medulla* or *substantia alba*.

c, After having removed the *falx*, and separated the two hemispheres from each other, we perceive a white convex body, the *corpus callosum*, which is a portion of the medullary substance, uniting the two hemispheres to each other, and not invested by the *cortex*. By making an horizontal incision in the brain, on a level with this *corpus callosum*, we discover two oblong cavities, named the *anterior* or *lateral ventricles*, one in each hemisphere. These two ventricles, which communicate with each other posteriorly, are separated from each other throughout the greatest part of their extent, by a very fine medullary partition, called *septum lucidum*, from its delicacy and transparency. This septum is attached superiorly to a production of the *corpus callosum*, called the *fornix*. When we have removed this *fornix*, we discover several eminences, four pair of which follow each other very regularly; and these are the *corpora striata*, the *thalami nervorum opticorum*, and four others which M. Winslow has named *tubercula quadrigemina*. The *corpora striata* derive their name from their striated appearance, which seems to be occasioned by an intermixture of the cortical and medullary substances of the brain. The *thalami nervorum opticorum* are so called because the optic nerves arise chiefly from them; and they are likewise composed both of the *cortex* and *medulla*. The *tubercula quadrigemina* are four smaller eminences, situated behind the two other pair we just now described. The *pineal gland*, rendered so famous by Descartes, who supposed it to be the seat of the soul, is a small, soft, and oval body, about the size of a pea, situated be-

hind the *thalami*, immediately above the *tubercula*. Under the *thalami*, we observe another cavity, which constitutes the third ventricle of the brain, and communicates with the anterior ventricles, with the *glandula pituitaria*, and likewise with the fourth ventricle. Its communication with the anterior ventricles is by means of a very narrow opening or *rima*, which extends from the anterior portion of the third ventricle, to the posterior portion of the two others, where they communicate with each other, and with the *glandula pituitaria*, by a canal, which from its form is called *infundibulum*. The *glandula pituitaria* is a soft and spongy body, placed upon the *fella turcica*. The third ventricle communicates with the fourth ventricle, which is placed between the *cerebellum* and *medulla oblongata*, by means of a groove or channel, which is the *aquæductus Sylvii*. The anterior ventricles, the *thalami nervorum opticorum*, the *pineal gland*, the *tubercula quadrigemina*, and other parts near these, are covered by an exceeding fine delicate and vascular membrane called *plexus choroides*.

The *cerebellum*, which is divided into two lobes, is of a more firm and compact substance than the *cerebrum*; but, like that, is composed of the cortical and medullary substances. From each side of the fourth ventricle of the brain, there arises a medullary trunk, which is distributed through the medullary substance of the *cerebellum*, by an infinite number of ramifications, which may be observed by making a vertical section of the *cerebellum*, where they constitute what is called *arbor vita*. The reunion of the medullary substance of the *cerebrum* and *cerebellum*, at the basis of the cranium, forms the *medulla oblongata*, which extends to the great foramen of the occipital bone.

The *medulla spinalis*, which fills the vertebral canal from this foramen to the inferior portion of the *os sacrum*, is a continuation of the *medulla oblongata*, but with some little difference in its composition; the latter being altogether made up of the medullary substance; whereas the *medulla spinalis* appears to have its middle part composed of a brownish mass, resembling the cortical substance of the brain. The *medulla spinalis* is invested by a continuation of the membranes of the brain (*v*); and the *pia mater*, by sending off productions into its substance, affords a support to the blood-vessels as they ramify through it.

CHAP. II. Of the NERVES.

a, THE nerves are white and glistening chords, differing from each other in size, colour, and consistence, and deriving their origin from the *medulla oblongata* and *medulla spinalis*. Anatomists describe forty pair of these nerves; ten of which originate from the *medulla oblongata*, and thirty from the *medulla spinalis*.

b, By carefully and gently elevating the brain from the basis of the cranium, we find the first ten pair arising in the following order: 1. The *nervi olfactorii*, distributed thro' the pituitary membrane, which constitutes the organ of smell. 2. The *optici*, which go to the eyes, where they receive the impressions of visible

(v) The dissection of the brain requires considerable dexterity; and the reader, till he has seen such a dissection performed, will perhaps not be able to derive very clear ideas of its anatomy, from any description he can meet with of it in books. The uses of its several parts have never yet been ascertained.

fible objects. 3. The *oculorum motores* so called, because they are distributed to the muscles of the eye. 4. The *pathetici*, distributed to the superior oblique muscles of the eyes, the motion of which is expressive of certain passions of the soul. 5. The nerves of this pair soon divide into three principal branches, and each of these has a different name. Its upper division is the *ophthalmicus*, which is distributed to various parts of the eyes, eye-lids, forehead, nose, and integuments of the face. The second is called the *maxillaris superior*, and the third *maxillaris inferior*, both which names allude to their distribution. 6. The *abductores*; each of these nerves is distributed to the abductor muscle of the eye, so called because it helps to draw the globe of the eye from the nose. 7. The *auditorii* (w), which are distributed through the organs of hearing. 8. The *par vagum*, which derives its name from the great number of parts to which it gives branches, both in the thorax and abdomen. 9. The *linguales*, or *hypoglossi*, which are distributed to the tongue, and appear to contribute both to the organ of taste, and to the motions of the tongue. 10. A pair which is distributed to the muscles of the head and neck.

c, It has been already observed, that the spinal marrow sends off thirty pair of nerves, and these are chiefly distributed to the exterior parts of the trunk, and to the extremities. They are commonly distinguished into the *cervical*, *dorsal*, *lumbar*, and *sacral nerves*. The *cervical*, which pass out from between the several vertebrae of the neck, are seven in number; the *dorsal*, twelve; the *lumbar*, five; and the *sacral*, five (x).

d, In the following course of the nerves both of the medulla oblongata and medulla spinalis, we observe, in many of them, irregular enlargements of their substance, which are called *ganglions*. These knots or tumours are not the effects of disease, but are to be met with in the same parts of the same nerves both in the fœtus and the adult.

e, Some writers have considered them as so many little brains; and many other theories have been formed concerning them; none of which, however, have as yet led to ascertain their use.

f, The nerves, like the blood-vessels, in their course through the body, communicate with each other; and each of these communications constitutes what is called a *plexus*, from whence branches are again detached to different parts of the body. Some of these are constant, and considerable enough to be distinguished by particular names, as the *semilunar plexus*, the *pulmonary plexus*, the *hepatic*, the *cardiac*, &c.

g, It would be foreign to the purpose of this article to follow the nerves through all their distributions; but it may be remembered, that, in describing the different viscera, mention was made of the nerves distributed to them. There is one pair, however, called the *intercostal*, or *great sympathetic nerve*; which seems to

deserve a particular description, because it has an almost universal connection and correspondence with all the other nerves of the body. Authors are not perfectly agreed about the origin of the *intercostal*: but it may perhaps not improperly be described as beginning from filaments of the fifth and sixth pair; it then passes out of the cranium, through the bony canal of the carotid; from whence it descends laterally close to the bodies of the vertebrae, and receives branches from almost all the vertebral nerves; forming almost as many *ganglions* in its course through the thorax and abdomen. It sends off an infinite number of branches to the viscera in those cavities, and forms several *plexus* with the branches of the eighth pair or par vagum.

h, That the nerves are destined to convey the principles of motion and sensibility to the brain from all parts of the system, there can be no doubt; but how these effects are produced, no one has ever yet been able to determine. The inquiry has been a constant source of hypothesis in all ages; and has produced some ingenious ideas, and many erroneous positions, but without having hitherto afforded much satisfactory information.

i, The nerves appear to be perfectly inelastic, and are covered by the dura and pia mater; seeming to owe their firmness to the former of these tunics.

k, Some physiologists have considered a trunk of nerves as a solid cord, capable of being divided into an infinite number of filaments, by means of which the impressions of feeling are conveyed to the sensorium commune. Others have supposed it to be a canal, which afterwards separates into more minute channels; or, perhaps, as being an assemblage of many very small and distinct tubes, connected to each other, and thus forming a cylindrical cord. They who contend for their being solid bodies, are of opinion, that feeling is occasioned by vibration: so that, for instance, according to this system, by pricking the finger, a vibration would be occasioned in the nerve distributed through its substance; and the effects of this vibration, when extended to the sensorium, would be an excital of pain. But the inelasticity, the softness, the connection, and the situation of the nerves, are so many proofs that vibration has no share in the cause of feeling.

l, Others have supposed, that in the brain and spinal marrow a very subtle fluid is secreted, and from thence conveyed through the impenetrable tubes which they consider as existing in the nerves. They have farther supposed, that this very subtle fluid, to which they have given the name of *animal spiritus*, is secreted in the cortical substance of the brain and spinal marrow, from whence it passes through the medullary substance. This, like the other system, is founded altogether on hypothesis; but it seems to be an hypothesis derived from much more probable principles, and there are many ingenious arguments to be brought in its support.

E X.

(w) This pair, soon after its entrance into the meatus auditorius internus, separates into two branches. One of these is of a very soft and pulpy confidence, is called the *portio mollis* of the seventh pair, and is spread over the inner part of the ear. The other passes out through the aqueduct of Fallopius in a firm chord, which is distinguished as the *portio dura*, and is distributed to the external ear, and other parts of the neck and face.

(x) The reader will observe, that the amount of these several divisions is only 29 pair. But there is another pair called the *spinal*, which arises from the medulla spinalis at its beginning, and, ascending through the great foramen of the os occipitis into the cranium, passes out again close to the eighth pair, with which however it does not unite; and it is afterwards distributed chiefly to the muscles of the neck, back, and scapula. In this course it sends off filaments to different parts, and likewise communicates with several other nerves.

EXPLANATION OF PLATE XVIII.

FIG. 1. Represents the inferior part of the brain;—the anterior part of the whole spine, including the medulla spinalis;—with the origin and large portions of all the NERVES.

AA, The anterior lobes of the cerebrum. BB, The lateral lobes of the cerebrum. CC, The two lobes of the cerebellum. D, Tuber annulare. E, The passage from the third ventricle to the infundibulum. F, The medulla oblongata, which sends off the medulla spinalis through the spine. GG, That part of the os occipitis which is placed above (HH), the transverse processes of the first cervical vertebra. II, &c. The seven cervical vertebrae, with their intermediate cartilages. KK, &c. The twelve dorsal vertebrae, with their intermediate cartilages. LL, &c. The five lumbar vertebrae, with their intermediate cartilages. M, The os sacrum. N, The os coccygis.

NERVES.—1 1, The first pair of nerves, named *olfactory*, which go to the nose. 2 2, The second pair, named *optic*, which goes to form the tunica retina of the eye. 3 3, The third pair, named *motor oculi*; it supplies most of the muscles of the eye-ball. 4 4, The fourth pair, named *pathetic*,—which is wholly spent upon the musculus trochlearis of the eye. 5 5, The fifth pair divides into three branches.—The first, named *ophthalmic*, goes to the orbit, supplies the lachrymal gland, and sends branches out to the forehead and nose.—The second, named *superior maxillary*, supplies the teeth of the upper jaw, and some of the muscles of the lips.—The third, named *inferior maxillary*, is spent upon the muscles and teeth of the lower jaw, tongue, and muscles of the lips. 6 6, The sixth pair, which, after sending off the beginning of the intercostal or great sympathetic, is spent upon the abductor oculi. 7 7, The seventh pair, named *auditory*, divides into two branches.—The largest, named *portio mollis*, is spent upon the internal ear.—The smallest, *portio dura*, joins to the fifth pair within the internal ear by a reflected branch from the second of the fifth; and within the tympanum, by a branch from the third of the fifth, named *chorda tympani*.—Vid. fig. 3. near B. 8 8, &c. The eighth pair, named *par vagum*,—which accompanies the intercostal, and is spent upon the tongue, larynx, pharynx, lungs, and abdominal viscera. 9 9, The ninth pair, which are spent upon the tongue. 10 10 &c. The intercostal, or great sympathetic, which is seen from the sixth pair to the bottom of the pelvis on each side of the spine, and joining with all the nerves of the

spine;—in its progress supplying the heart, and, with the par vagum, the contents of the abdomen and pelvis. 11 11, The *accessorius*, which is spent upon the sternocleidomastoideus and trapezius muscles. 12 12, The first cervical nerves;—13 13, The second cervical nerves;—both spent upon the muscles that lie on the neck, and teguments of the neck and head. 14 14, The third cervical nerves, which, after sending off (15 15, &c.) the phrenic nerves to the diaphragm, supply the muscles and teguments that lie on the side of the neck and top of the shoulder. 16 16, The brachial plexus, formed by the fourth, fifth, sixth, seventh cervicals, and first dorsal nerves,—which supply the muscles and teguments of the superior extremity. 17 17, The twelve dorsal, or proper intercostal nerves, which are spent upon the intercostal muscles and some of the large muscles which lie upon the thorax. 18 18, The five lumbar pairs of nerves, which supply the lumbar and abdominal muscles, and some of the teguments and muscles of the inferior extremity. 19 19, The sacro-sciatic, or posterior crural nerve, formed by the two inferior lumbar, and three superior of the os sacrum. This large nerve supplies the greatest part of the muscles and teguments of the inferior extremity. 20, The stomachic plexus, formed by the eighth pair. 21 21, Branches of the solar or celiac plexus, formed by the eighth pair and intercostals, which supply the stomach and chylopoietic viscera. 22 22, Branches of the superior and inferior mesenteric plexuses, formed by the eighth pair and intercostals, which supply the chylopoietic viscera, with part of the organs of urine and generation. 23 23, Nerves which accompany the spermatic cord. 24 24, The hypogastric plexus, which supplies the organs of urine and generation within the pelvis.

FIG. 2, 3, 4, 5. Shew different views of the inferior part of the brain, cut perpendicularly through the middle,—with the origin and large portions of all the nerves which pass out through the bones of the cranium,—and the three first cervicals.

A, The anterior lobe. B, The lateral lobe of the cerebrum. C, One of the lobes of the cerebellum. D, Tuber annulare. E, Corpus pyramidale, in the middle of the medulla oblongata. F, The corpus olivare, in the side of the medulla oblongata. G, The medulla oblongata. H, The medulla spinalis.

NERVES.—1 2 3 4 5 6 7 8 and 9, Pairs of nerves. 10 10, Nervus accessorius, which comes from—11, 12 and 13, the three first cervical nerves.

PART VII. OF THE SENSES AND THEIR ORGANS.

CHAP. I.

Of the Senses in General.

407 a, THE word *sense*, among physiologists, seems to imply, not only the sensation excited in the mind by certain impressions made on the body, but likewise the organ destined to receive and transmit these impressions to the sensorium.

b, The senses are usually described as being only five in number; but a very little attention only seems to be

required to perceive, that a greater number may very properly be admitted. *Hunger* and *thirst* are sensations which have each their peculiar organ; and that of *pain* seems to be extended through all the parts endued with sensibility. But the five senses here to be described, are the exterior senses of *touch*, *taste*, *smelling*, *vision*, and *hearing*. Each of these organs being of a peculiar structure, is susceptible only of particular impressions, which will be pointed out as we proceed to describe each of them separately.

Fig. 1.

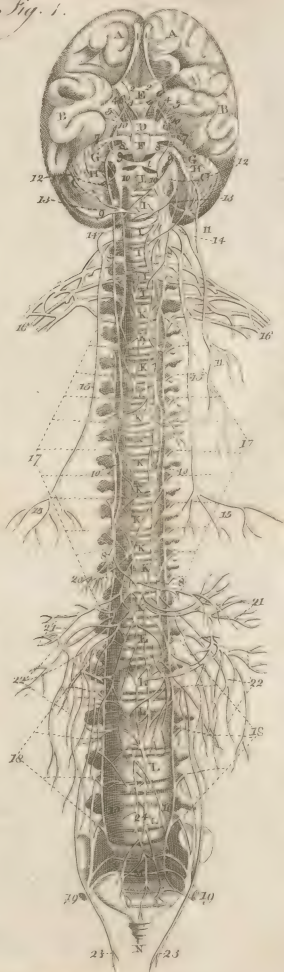


Fig. 2.

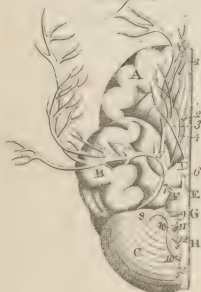


Fig. 3.

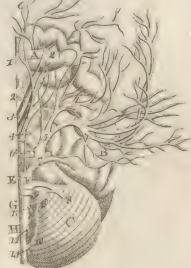
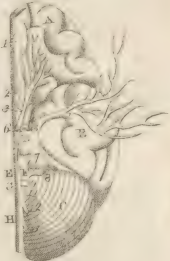


Fig. 4.



Fig. 5.





CHAP. II.

Of the Sense of FEELING.

402 a, THE *sense* of feeling is perhaps seated in all parts of the body, but is commonly said to be confined to the nervous papillæ of the *cutis* or true skin, which, with their appendages and their several uses, have been already described.

b, The exterior properties of bodies, such as their solidity, their humidity, their inequality, their smoothness, dryness, or fluidity, and likewise their degree of heat, seem all to be capable of making different impressions on the papillæ, and consequently of exciting different ideas in the sensorium commune. But the organ of touch, like all the other senses, is not equally delicate in every part of the body, or in every subject; being in some much more exquisite than in others.

CHAP. III.

Of the TASTE.

403 a, THE *sense* of taste is seated chiefly in the tongue, the situation and figure of which are sufficiently known. The tongue is divided into its *basis* and *apex*; is thinner at its edges than it is in its middle part; and has a line extending from its *basis* to its *apex*, which divides it as it were into two equal portions, and is called *linea lingue mediana*. The tongue is composed of muscular fibres, which are disposed in every direction. Some of these fibres pass out from it in different ways, and form three muscles on each side; while others are confined altogether to the tongue, and terminate chiefly on its surface.

b, From its superior surface arise an infinite number of *papillæ*; which may be divided into three classes, the *capitata*, *semi-lenticulares*, and *pyramidales*. The first of these are the largest and most easy of demonstration. They are situated towards the basis of the tongue; and are described as resembling mushrooms, which are connected to the tongue only by a very small neck. The *semi-lenticulares* differ only from the *capitata* in having the whole surface of their basis attached to the tongue, of which they occupy the middle portion. The *pyramidales* are more minute papillæ, of a conical shape, very numerous on the apex and borders of the tongue.

c, Towards the basis of the tongue, we meet with a little cavity named by Morgagni *foramen cæcum*, the use of which has not yet been ascertained.

d, The tongue is covered by a continuation of the cuticle which lines the inside of the mouth. This tunic every where exactly embraces the papillæ, and is exceedingly soft and pulpy from the perpetual warmth and moisture of the parts. At the under part of the tongue it makes a reduplication called the *frænum*, which serves to prevent the too great motion of the tongue, and to fix it in its situation. But besides this attachment, the tongue is connected, by means of its muscles and membranous ligaments, to the lower jaw, the os hyoides, and the styloid processes.

e, The tongue receives its arteries and veins from the internal carotids and jugulars. At the sides of the *frænum* we observe two considerable veins called the

ranular veins; and the arteries which correspond with them have the same name. The tongue receives very considerable branches of nerves on each side, from the fifth and ninth pair. The former of these are lost at the apex of the tongue, and the latter are spread over its basis.

f, The variety of tastes seems to be occasioned by the different impressions made on the papillæ by the principles of our aliment; but the mechanical reason of this diversity, has not yet been determined. It has been looked for in the saline particles of our food; and, in general, whatever contains less salt than the saliva is found to be insipid.

g, The different state of the papillæ with respect to their moisture, their figure, or their covering, seems to produce a considerable difference in the taste, not only in different people, but in the same subject in sickness and in health. The great use of the taste seems to be to enable us to distinguish wholesome and salutary food from that which is unhealthy; and we observe that many quadrupeds, by having their papillæ very large and long, have the faculty of distinguishing flavours with infinite accuracy.

CHAP. IV.

OF SMELLING.

404 a, THIS, like the sense of taste, seems intended to direct us to a proper choice of aliment; and is chiefly seated in the nose, which is distinguished into its external and internal parts. The situation and figure of the former of these do not seem to require a definition. It is composed of bones and cartilages, covered by muscular fibres and by the common integuments. The bones make up the upper portion, and the cartilages the lower one. The *septum narium*, like the nose, is likewise in part bony, and in part cartilaginous. These bones and their connections were described in the osteology.

b, The internal part of the nose, besides the ossa spongiosa, has six cavities or sinuses, the *maxillary*, the *frontal*, and the *sphenoid*, which were all described with the bones of the head. They all open into the nostrils; and the nose likewise communicates with the mouth, larynx, and pharynx, behind the *velum palati*.

c, All these several parts, which are included in the internal division of the nose, *viz.* the inner surface of the nostrils, the lamellæ of the ossa spongiosa, and the sinuses, are lined by a thick and very vascular membrane, which is the *membrana pituitaria Schneideri*. This membrane is truly the organ of smelling, but its real structure does not yet seem to be perfectly understood. It appears to be a continuation of the cuticle, which lines the inner surface of the mouth. In some parts of the nose it is smooth and firm, and in others it is loose and spongy. It is constantly moistened by a mucilaginous lymph, of which the finer parts are carried off probably by the air we breathe; and the remainder, by being retained in the sinuses, acquires considerable consistence (γ).

d, The arteries and veins, which are distributed to this membrane, are branches from the external carotids and jugulars. The first pair of nerves, the *olfactory*, are

(γ) The manner in which this mucus is secreted, is not determined. Some writers have described this membrane as being glandular; but no glands appear to exist in it.

are spread over every part of it, and it likewise receives a branch from the fifth pair.

e, After what has been said of the pituitary membrane, it will not be difficult to conceive how the air we draw in at the nostrils, being impregnated with the effluvia of bodies, excites in us that kind of sensation we call *smelling*. As these effluvia, from their being exceedingly light and volatile, cannot be capable in a small quantity of making any great impression on the extremities of the olfactory nerves, it was necessary to give considerable extent to the pituitary membrane, that by this means a greater number of odoriferous particles might be admitted at the same time. When we wish to take in much of the effluvia of any thing, we naturally close the mouth, that all the air we inspire, may pass through the nostrils; and at the same time, by means of the muscles of the nose, the nostrils are dilated, and a greater quantity of air is drawn into them.

f, In many quadrupeds, the sense of smelling is much more extensive and delicate than it is in the human subject; and in the human subject, it seems to be more perfect, the less it is vitiated by a variety of smells. It is not always in the same state of perfection, being naturally affected by every change in the pituitary membrane, and of the lymph with which that membrane is moistened.

CHAP. V.

Of the EAR, and HEARING.

405

a, THE ear is commonly distinguished into external and internal. The former includes all that we are able to discover without dissection, and the meatus auditorius, as far as the tympanum; and the latter, all the other parts of the ear.

b, The external ear is a cartilaginous funnel, covered by the common integuments, and attached, by means of its ligaments and muscles, to the temporal bone. Although capable only of a very obscure motion, it is found to have two muscles. Different parts of it are distinguished by different names. All its cartilaginous part is called *ala* or *wings*, to distinguish it from the soft and pendent part below, called the *lobe*. Its outer circle, or border, is called *helix*; and the semicircle within this, *antihelix*. The moveable cartilage placed immediately before the meatus auditorius, which it may be made to close exactly, is named *tragus*; and an eminence opposite to this at the extremity of the *antihelix*, is called *antitragus*. The *concha* is a considerable cavity formed by the extremities of the *helix* and *antihelix*. The *meatus auditorius*, which at its opening is cartilaginous, is covered by a very thin membrane, which is a continuation of the cuticle from the surface of the ear.

c, In this canal we find a yellow wax, which is supposed to be secreted by very minute glands or follicles at the beginning of the meatus. This secretion, which is at first of an oily consistence, defends the membrane of the tympanum from the injuries of the air, and by its bitterness prevents minute insects from entering into the ear. But, when from neglect or disease it accumulates in too great a quantity, it sometimes occasions deafness. The inner extremity of the meatus is

closed by a very thin, transparent membrane, the *membrana tympani*, which is set in a bony circle like the head of a drum. The upper edge of this membrane not being always close to the bone, affords a passage to the air between the external and internal ear. Under the *membrana tympani* runs a branch of the fifth pair of nerves, called *chorda tympani*; and beyond this membrane is the cavity of the tympanum, which is about seven or eight lines wide, and half so many in depth; it is irregular, and every where lined by a very fine membrane. There are four openings to be observed in this cavity. It communicates with the mouth by means of the *Eustachian tube*. This canal, which is in part bony and in part cartilaginous, begins by a very narrow opening at the anterior and almost superior part of the tympanum, increasing in size as it advances towards the palate of the mouth, where it terminates by an oval opening. This tube is every where lined by the same membrane that covers the inside of the mouth. The real use of this canal does not seem to have been hitherto satisfactorily ascertained; but found would seem to be conveyed through it to the *membrana tympani*, deaf persons being often observed to listen attentively with their mouths open. Opposite to this is a minute passage, which leads to the sinuosities of the mastoid process; and the two other openings, which are in the internal process of the os petrosus, are the *fensella ovalis* and *fensella rotunda*, both which are covered by a very fine membrane.

d, There are three distinct bones in the cavity of the tympanum; and these are the *malleus*, *incus*, and *stapes*. Besides these, there is a fourth, which is the *os orbiculare*, considered by some anatomists as a process of the *stapes*, which is necessarily broken off by the violence we are obliged to use in getting at these bones; but, when accurately considered, it seems to be a distinct bone.

e, The *malleus* is supposed to resemble a hammer, being larger at one extremity, which is its head, than it is at the other, which is its handle. The latter is attached to the *membrana tympani*, and the head of the bone is articulated with the *incus*.

The *incus*, as it is called from its shape, though it seems to have less resemblance to an anvil than to one of the dentes molares with its roots widely separated from each other, is distinguished into its body and its legs. One of its legs is placed at the entry of the canal which leads to the mastoid process; and the other, which is somewhat longer, is articulated with the *stapes*, or rather with the *os orbiculare*, which is placed between them.

g, The third bone is very properly named *stapes*, being perfectly shaped like a stirrup. Its basis is fixed into the *fensella ovalis*, and its upper part is articulated with the *os orbiculare*. What is called the *fensella rotunda*, though perhaps improperly, as it is more oval than round, is observed a little above the other, in an eminence formed by the os petrosus, and is closed by a continuation of the membrane that lines the inner surface of the tympanum. The *stapes* and *malleus* are each of them furnished with a little muscle (z)

h, The *labyrinth*, is the only part of the ear which remains to be described. It is situated in the os petrosus,

(z) Anatomists have usually described three muscles of the malleus; the *externus*, *obliquus*, and *internus*. Others speak only of two; but the *internus* only seems to deserve the name of muscle, the others being truly ligaments.

fum, and is separated from the tympanum by a partition which is every where bony, except at the two fenestræ. It is composed of three parts; and these are the *vestibulum*, the *semicircular canals*, and the *cochlea*.

i, The *vestibulum* is an irregular cavity, much smaller than the tympanum, situated nearly in the centre of the os petrosum, between the tympanum, the cochlea, and the semicircular canals. It is open on the side of the tympanum by means of the fenestra ovalis, and communicates with the upper portion of the cochlea by an oblong foramen, which is under the fenestra ovalis, from which it is separated only by a very thin partition.

k, Each of the three *semicircular canals* forms about half a circle of nearly a line in diameter; and running each in a different direction, they are distinguished into *vertical*, *oblique*, and *horizontal*. These three canals open by both their extremities into the vestibulum; but the *vertical* and the *oblique* being united together at one of their extremities, there are only five orifices to be seen in the vestibulum.

l, The *cochlea* is a canal which takes a spiral course, not unlike the shell of a snail. From its basis to its apex it makes two turns and a half; and is divided into two canals by a very thin lamina or septum, which is in part bony, and in part membranous, in such a manner, that these two canals only communicate with each other at the point. One of them opens into the vestibulum, and the other is covered by the membrane that closes the *fenestra rotunda*. The bony lamella which separates the two canals, is exceedingly thin, and fills about two thirds of the diameter of the canal. The rest of the septum is composed of a most delicate membrane, which lines the whole inner surface of the cochlea, and seems to form this division in the same manner as the two membranous bags of the pleura, by being applied to each other, form the mediastinum.

m, The arteries of the external ear come from the temporal and occipital, and its veins pass into the jugular. The internal ear receives branches of arteries from the basillary and internal carotid; and its veins empty themselves into the sinuses of the dura mater, and into the internal jugular.

n, The *portio mollis* of the seventh pair is distributed through the cochlea, the vestibulum, and the *semicircular canals*; and the *portio dura* sends off a branch to the tympanum, and other branches to the external ear and parts near it.

o, The *sense of hearing*, in producing which all the parts we have described assist, is occasioned by a certain modulation of the air collected by the funnel-like shape of the external ear, and conveyed through the *meatus auditorius* to the *membrana tympani*. That sound is propagated by means of the air, is very easily proved by ringing a bell under the receiver of an air-pump: the sound it affords being found to diminish gradually as the air becomes exhausted, till at length it ceases to be heard at all. Sound moves through the air with great velocity; but the strength of the sound seems to depend on the state of the air, as it is greater in a cold and dense, than in a warm and rarefied air*.

p, That the air vibrating in the *membrana tympani*

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communicates its vibration to the different parts of the labyrinth, and thus affects the auditory nerve so as to produce sound, seems to be very probable; and it is imagined, that the malleus, by means of its muscle, serves to increase or diminish the tension of the *membrana tympani*; but the situation, the minuteness, and the variety of the parts which compose the ear, do not permit much to be advanced with certainty concerning their mode of action.

q, Some of these parts seem to constitute the immediate organ of hearing, and these are all the parts of the *vestibulum*: but there are others which seem intended for the perfection of this sense, without being absolutely essential to it. It has happened, for instance, that the *membrana tympani*, and the little bones of the ear, have been destroyed by disease, without depriving the patient of the sense of hearing (A).

r, Before we conclude this article, it will be right to explain certain phenomena which will be found to have a relation to the organ of hearing.

s, Every body has, in consequence of particular sounds, occasionally felt that disagreeable sensation which is usually called *setting the teeth on edge*; and the cause of this sensation is to be traced to the communication which the *portio dura* of the auditory nerve has with the branches of the fifth pair, which are distributed to the teeth, being probably occasioned by the violent tremor produced in the *membrana tympani* by these very acute sounds. Upon the same principle we may explain the strong idea of sound which a person has who holds a vibrating string between his teeth.

t, The humming which is sometimes perceived in the ear, without any exterior cause, is perhaps occasioned by an increased pulsation of the arteries in consequence of obstructions in some of the parts of the ear. This pulsation, which in a natural and healthy state is slight and regular, may by disease be increased so as to affect the auditory nerve in a manner sufficient to produce the idea of sound.

CHAP. VI.

OF VISION*.

* See Optics.

a, THE eyes, which constitute the organ of vision, are situated in two bony cavities, named *orbits*, where they are surrounded by several parts, which are either intended to protect them from external injury, or to assist in their motion.

b, The globe of the eye is immediately covered by two *eye-lids* or *palpebrae*, which are composed of muscular fibres covered by the common integuments, and lined by a very fine and smooth membrane, which is from thence extended over part of the globe of the eye, and is called *tunica conjunctiva*. Each eye-lid is cartilaginous at its edge; and this border, which is called *tarsus*, is furnished, as we all know, by a row of hairs named *cilia* or *eye-lashes*.

c, The *cilia* serve to protect the eye from insects and minute bodies floating in the air, and likewise to moderate the action of the rays of light in their passage to the retina. At the roots of these hairs there are fe-

D d d

baccous

(A) This observation has led to a supposition, that a perforation of this membrane may, in some cases of deafness, be useful; and Mr Cheselden relates, that some years ago a malefactor was pardoned on condition that he should submit to this operation; but the public clamour raised against it was so great, that it was thought right not to perform it.

baceous follicles, first noticed by *Melbomius*, which discharge a glutinous liniment. Sometimes the fluid they secrete has too much viscosity, and the eye-lids become glued to each other.

d, The upper border of the orbit is covered by the *eye-brows* or *supercilia*, which by means of two muscles are capable of being brought towards each other, or of being carried upwards. They have been considered as serving to protect the eyes, but they are probably intended more for ornament than utility (n).

e, The orbits in which the eyes are placed, are furnished with a good deal of fat, which affords a soft bed on which the eye performs its several motions. The inner angle of each orbit, or that part of it which is near the nose, is called *canthus major*, or the *great angle*; and the outer angle, which is on the opposite side of the eye, is the *canthus minor*, or *little angle*.

f, The little reddish body which we observe in the great angle of the eye-lids, and is called *caruncula lachrymalis*, is supposed to be of a glandular structure, and, like the follicles of the eye-lids, to secrete an oily humour. But its structure and use do not seem to have been hitherto accurately determined. The surface of the eye is constantly moistened by a very fine limpid fluid called the *tear*, which is chiefly, and perhaps wholly, derived from a large gland of the conglomerate kind, situated in a small depression of the *os frontis* near the outer angle of the eye. Its excretory ducts pierce the *tunica conjunctiva*, just above the cartilaginous borders of the upper eye-lids. When the tears were supposed to be secreted by the caruncle, this gland was called *glandula innominata*; but now that its structure and uses are ascertained, it very properly has the name of *glandula lachrymalis*. The tears poured out by the ducts of this gland are, in a natural and healthy state, incessantly spread over the surface of the eye, to keep it clear and transparent, by means of the eye-lids, and as constantly pass out at the opposite corner of the eye or inner angle, through two minute orifices, the *puncta lachrymalia* (c); being determined into these little openings by a reduplication of the *tunica conjunctiva*, shaped like a crescent, the two points of which answer to the *puncta*. This reduplication is named *membrana or valvula semilunaris*. Each of these *puncta* is the beginning of a small excretory tube through which the tears pass into a little pouch or reservoir, the *sacculus lachrymalis*, which lies in an excavation formed partly by the nasal process of the *os maxillare superius*, and partly by the *os unguis*. The lower part of this sac forms a duct, called the *ductus ad nares*, which is continued through a bony channel, and opens into the nose, through which the tears are occasionally discharged (n).

ged (n).

g, The motions of the eye are performed by six muscles; four of which are *straight*, and two *oblique*. The *straight muscles* are distinguished by the names of *elevator*, *depressor*, *adductor*, and *abductor*, from their several uses in elevating or depressing the eye, drawing it towards the nose, or carrying it from the nose towards the temple. All these four muscles arise from the bottom of the orbit, and are inserted by flat tendons into the globe of the eye. The *oblique muscles* are intended for the more compound motions of the eye. The first of these muscles, the *obliquus superior*, does not, like the other four muscles we have described, arise from the bottom of the orbit, but from the edge of the foramen that transmits the optic nerve, which separates the origin of this muscle from that of the others. From this beginning it passes in a straight line towards a very small cartilaginous ring, the situation of which is marked in the skeleton by a little hollow in the internal orbital process of the *os frontis*. The tendon of the muscle passing through this ring, is inserted into the upper part of the globe of the eye, which it serves to draw forwards, at the same time turning the pupil downwards.

h, The *obliquus inferior* arises from the edge of the orbit, under the opening of the ductus lachrymalis, and is inserted somewhat posteriorly into the outer side of the globe, serving to draw the eye forwards and turn the pupil upwards. When either of these two muscles act separately, the eye is moved on its axis; but when they act together, it is compressed both above and below.

i, The eye itself, which is now to be described with its tunics, humours, and component parts, is of a spherical figure. Of its tunics, two are only partial coverings; and these are the *tunica conjunctiva* and *tunica albuginea*. The former has been already described as being reflected from the inner surface of the eye-lids over the anterior portion of the eye. The *tunica albuginea* is placed immediately under the *tunica conjunctiva*, and appears to be a continuation of the membrane that invests the tendons of the muscles which are inserted into the globe of the eye (s).

k, The immediate tunics of the eye, which are to be demonstrated when its partial coverings and all the other parts with which it is surrounded are removed, are the *sclerotica*, *choroides*, and *retina*.

l, The *sclerotica*, which is the exterior coat, is every where white and opaque, except at its anterior part, where it has more of convexity than any other part of the globe, and, being exceedingly transparent, is called *cornea* (r).

m, The

(n) It is observable, that the eye-brows are peculiar to the human species.

(c) It sometimes happens, that this very pellicid fluid which moistens the eye, being poured out through the excretory ducts of the lachrymal gland faster than it can be carried off through the *puncta*, trickles down the cheek, and is then strictly and properly called *tears*. When this secretion is constantly too copious, it constitutes a disease called *epiphora*; but we all know, that the application of any irritating particles to the eye, and sometimes the passions of the mind, will occasion a temporary increase of this lymph.

(d) When the ductus ad nares becomes obstructed, in consequence of disease, the tears are no longer able to pass into the nostrils; the sacculus lachrymalis becomes distended; and inflammation, and sometimes ulceration, taking place, constitute the disease called *stislula lachrymalis*.

(e) The *tunica albuginea* seems to be formed in this manner, and not by an expansion of the tendons themselves as it has been generally supposed.

(f) Some writers, who have given the name of *cornea* to all this outer coat, have named what is here and most commonly called *sclerotica*, *cornea opaca*; and its anterior and transparent portion, *cornea lucida*. The optic nerve enters

m, The *choroides*, or *uvea*, has been considered as an expansion of the pia matral coat of the optic nerve. In its fore part we observe a circular hole, called the *pupil* or *sight of the eye*, which affords a passage to the rays of light. The *choroides* is composed of two laminæ (σ); the outermost of which is continued no farther than the edge of the *cornea*, to which it is attached all round, being observed to form a little whitish areola at the place of this union, which is named *ligamentum ciliare* (π). The inner lamina extends farther to form what is called the *iris* (ι), which is the part we are able to see through the *cornea*. It derives its name from the difference of its colours, and is perforated in its middle. This perforation is called *pupil* or *sight of the eye*. On the under side of the *iris* we observe many minute fibres called *processus ciliares*, which pass in *radii* or parallel lines from the circumference to the center; and the contraction and dilatation of the pupil are supposed to depend on the action of these ciliary processes (κ).

n, The posterior surface of the *iris*, the *processus ciliares*, and a part of the *tunica choroides*, are covered by a black mucus, for the purposes of accurate and distinct vision; but the manner in which it is secreted, has not been determined.

o, Immediately under the *tunica choroides* we find the third and inner coat, called the *retina*, which is supposed to be merely an expansion of the pulpy substance of the optic nerve, extending to the borders of the crystalline humour.

p, The greatest part of the globe of the eye, within these several tunics, is filled by a very transparent and gelatinous humour, of considerable consistence, which, from its supposed resemblance to fused glass, is called the *vitreous humour*. It is invested by a very fine and delicate membrane, called *tunica vitrea*, and sometimes *arachnoides*. It is supposed to be composed of two laminæ, one of which dips into its substance, and by dividing the humour into cells adds to its firmness. The fore-part of the vitreous humour is a little hollowed, to receive a very white and transparent substance of a firm texture, and of a lenticular and somewhat convex shape, named the *crystalline humour*. It is included in a *capsula*, which seems to be formed by a separation of the two laminæ of the *tunica vitrea*.

q, The fore-part of the eye is filled by a very thin and transparent fluid, named the *aqueous humour*, which occupies all the space between the crystalline and the prominent *cornea*. That part of the *choroides* which is called the *iris*, and which comes forward to form

the pupil, appears to be suspended, as it were, in this humour; and has occasioned this portion of the eye to be distinguished into two parts. One of these, which is the little space between the anterior surface of the crystalline and the *iris*, is called the *posterior chamber*; and the other, which is the space between the *iris* and the *cornea*, is called the *anterior chamber* of the eye. Both these spaces are completely filled with the aqueous humour (λ).

r, The eye receives its arteries from the internal carotid, and its veins empty themselves chiefly into the external jugulars. Some of the ramifications of these vessels appear on the inner surface of the *iris*, where they are seen to make very minute convolutions, which are sufficiently remarkable to be distinguished by the name of *circulus arteriosus*, though perhaps improperly, as they seem to be chiefly branches of veins.

s, The optic nerve passes in at the posterior part of the eye, in a considerable trunk, to be expanded for the purposes of vision, of which it is now universally supposed to be the immediate seat. But Messrs Mariotte and Mery contended, that the *choroides* is the seat of this sense; and the ancients supposed the crystalline to be so. Besides the optic, the eye receives branches from other nerves, but chiefly from the third pair.

t, The humours of the eye, together with the *cornea*, are calculated to refract and converge the rays of light in such a manner as to form at the bottom of the eye a distinct image of the object we look at; and the point where these rays meet, is called the *focus* of the eye. On the *retina*, as in a *camera obscura*, the object is painted in an inverted position; and it is only by habit that we are enabled to judge of its true situation, and likewise of its distance and magnitude. To a young gentleman, who was born blind, and who was couched by Mr Cheselden, every object (as he expressed himself) seemed to touch his eyes, as what he felt did his skin; and he thought no objects so agreeable as those which were smooth and regular, altho' for some time he could form no judgment of their shape, or guess what it was in any of them that was pleasing to him.

u, In order to paint objects distinctly on the *retina*, the *cornea* is required to have such a degree of convexity, that the rays of light may be collected at a certain point so as to terminate exactly on the *retina*. If the *cornea* is too prominent, the rays, by diverging too soon, will be united before they reach the *retina*, as is the case with near-sighted people, or *myopes*; and, on the contrary, if it is not sufficiently convex, the

D d d 2 rays

ters into the eye at its posterior part; and as only its pulpy substance is supposed to form the *retina*, the *sclerotica* has with great probability been ascribed to the dura matral covering of that nerve.

(g) The inner lamina is exceedingly vascular; and having been first described by Ruysch, is called *Ruyschiana*.

(h) M. Lieutaud seems with more propriety to have named it *plexus ciliaris*, as it appears to be formed by very numerous and minute filaments of nerves of the third pair.

(i) The *iris* has been sometimes described as a distinct coat, and called *uvea*.

(k) Besides these processes, anatomists usually describe the circular fibres of the *iris*, but they do not seem to be capable of demonstration. The *processus ciliares* have likewise been differently spoken of, being sometimes described as being composed of muscular fibres, and sometimes as being of a ligamentous texture; but a later and more probable opinion is, that they are neither muscular nor ligamentary, but filaments of nerves derived from the *plexus ciliaris*.

(l) When the crystalline becomes opaque so as to prevent the passage of the rays of light to the *retina*, it constitutes what is called a *cataract*; and the operation of couching consists in removing the diseased crystalline from its bed in the vitreous humour. In this operation, the *cornea* is perforated, and the aqueous humour escapes out of the eye; but it is constantly renewed again in a very short time. The manner, however, in which it is secreted, has not yet been determined.

rays will not be perfectly united when they reach the back part of the eye; and this happens to long-sighted people, or *prophii*, being found constantly to take place as we approach to old age, and the eye gradually flattens (M). These defects are to be supplied by means

of glasses. He who has too prominent an eye, will find his vision improved by means of a concave glass; and, upon the same principles, a convex glass will be found useful to a person whose eye is naturally too flat.

EXPLANATION OF PLATE XXI.

FIGURE 1. Shews the lachrymal canals, after the common teguments and bones have been cut away.

a, The lachrymal gland. b, The two puncta lachrymalia, from which the two lachrymal canals proceed to c, the lachrymal sac. d, The large lachrymal duct. e, Its opening into the nose. f, The caruncula lachrymalis. g, The eye-ball.

FIG. 2. An anterior view of the coats and humours of the eye.

a a a a, The tunica sclerotica cut in four angles, and turned back. b b b b, The tunica choroides adhering to the inside of the sclerotica, and the ciliary vessels are seen passing over—c c, The retina, which covers the vitreous humour. d d, The ciliary processes, which were continued from the choroid coat. e e, The iris. f, The pupil.

FIG. 3. Shews the optic nerves, and muscles of the eye.

a a, The two optic nerves before they meet. b, The two optic nerves conjoined. c, The right optic nerve. d, *Musculus attollens palpebræ superioris*. e, *Attollens oculi*. f, *Abductor*. g g, *Obliquus superior*, or *trochlearis*. h, *Abductor*. i, The eye-ball.

FIG. 4. Shews the eye-ball with its muscles.

a, The optic nerve. b, *Musculus trochlearis*. c, Part of the os frontis, to which the trochlea or pulley is fixed, through which,—d, The tendon of the *trochlearis* passes. e, *Attollens oculi*. f, *Adductor oculi*. g, *Abductor oculi*. h, *Obliquus inferior*. i, Part of the superior maxillary bone to which it is fixed. k, The eye-ball.

FIG. 5. Represents the nerves and muscles of the right eye, after part of the bones of the orbit have been cut away.

A, The eye-ball. B, The lachrymal gland. C, *Musculus abductor oculi*. D, *Attollens*. E, *Levator palpebræ superioris*. F, *Depressor oculi*. G, *Adductor*. H, *Obliquus superior*, with its pulley. I, Its insertion into the sclerotic coat. K, Part of the obliquus inferior. L, The anterior part of the os frontis cut. M, The crista galli of the ethmoid bone. N, The posterior part of the sphenoid bone. O, Transverse spinous process of the sphenoid bone. P, The carotid artery, denuded where it passes thro' the bones. Q, The carotid artery within the cranium. R, The ocular artery.

NERVES.—a a, The optic nerve. b, The third pair.—c, Its joining with a branch of the first branch of the fifth pair, to form l, The lenticular ganglion,—which sends off the ciliary nerves, d. e e, The fourth pair. f, The trunk of the fifth pair. g, The first branch of the fifth pair, named ophthalmic.—

h, The frontal branch of it. i, Its ciliary branches, along with which the nasal twig is sent to the nose. k, Its branch to the lachrymal gland. l, The lenticular ganglion. m, The second branch of the fifth pair, named superior maxillary. n, The third branch of the fifth pair, named inferior maxillary. o, The sixth pair of nerves,—which sends off p, The beginning of the great sympathetic. q, The remainder of the sixth pair, spent on c, The abductor oculi.

FIG. 6. Represents the head of a youth, where the upper part of the cranium is sawed off,—to shew the upper part of the brain, covered by the pia mater, the vessels of which are minutely filled with wax.

A A, The cut edges of the upper part of the cranium. B, The two tables and intermediate diploe. B B, The two hemispheres of the cerebrum. C C, The incisure made by the falx. D, Part of the tentorium cerebelli super expansum. E, Part of the falx, which is fixed to the crista galli.

FIG. 7. Represents the parts of the external ear, with the parotid gland and its duct.

a a, The helix. b, The antihelix. c, The antitragus. d, The tragus. e, The lobe of the ear. f, The cavitas innominata. g, The scapha. h, The concha. i i, The parotid gland. k, A lymphatic gland, which is often found before the tragus. l, The duct of the parotid gland. m, Its opening into the mouth.

FIG. 8. A view of the posterior part of the external ear, meatus auditorius, tympanum, with its small bones, and Eustachian tube of the right side.

a, The back part of the meatus, with the small ceruminous glands. b, The incus. c, Malleus. d, The chorda tympani. e, Membrana tympani. f, The Eustachian tube. g, Its mouth, from the fauces.

FIG. 9. Represents the anterior part of the right external ear, the cavity of the tympanum—its small bones, cochlea, and semi-circular canals.

a, The malleus. b, Incus with its long leg, resting upon the stapes. c, Membrana tympani. d, e, The Eustachian tube, covered by part of—f f, The *musculus circumflexus palati*. 1, 2, 3, The three femicircular canals. 4, The vestibule. 5, The cochlea. 6, The portio mollis of the seventh pair of nerves.

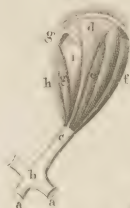
FIG. 10. Shews the muscles which compose the fleshy substance of the tongue.

a a, The tip of the tongue, with some of the papillæ minimæ. b, The root of the tongue. c, Part of the membrane of the tongue, which covered the epiglottis. d d, Part of the *musculus hyo-glossus*. e, The lingualis. f, *Genio-glossus*. g g, Part of the *stylo-glossus*.

ANATOMY

(M) Upon this principle they who in their youth are near-sighted may expect to see better as they advance in life, and their eyes gradually become more flat.

Fig. 3.



. Fig. 1.



Fig. 6.

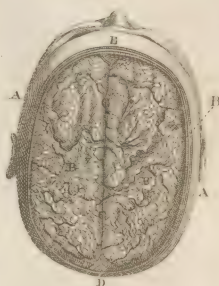


Fig. 2.



Fig. 5



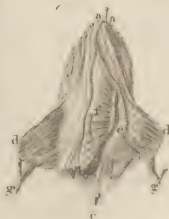
Fig. 1



Fig. 5.



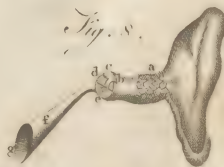
Fig. 10.



. Fig. 9.



Fig. 8.





ANATOMY of Plants. See PLANTS.

ANATOMY of Brutes. See COMPARATIVE Anatomy.

ANAXAGORAS, one of the most celebrated philosophers of antiquity, was born at Clazomene in Ionia about the 70th Olympiad. He was disciple of Anaximenes; and gave up his patrimony, to be more at leisure for the study of philosophy. He went first to Athens, and there taught eloquence; after which, having put himself under the tuition of Anaximenes, he gave lessons in philosophy in the same city. These he only gave to some particular friends and disciples, and with extreme caution. This, however, did not prevent, but rather was the cause of, his being accused of impiety, and thrown into prison, notwithstanding the credit and influence of Pericles, who was his disciple and intimate. Having been condemned to exile, he calmly yielded to the efforts of envy, and opened school at Lampfacus, where he was extremely honoured during the remainder of his life, and still more after his death, having had statues erected to his memory. He is said to have made some predictions relative to the phenomena of nature, upon which he wrote some treatises. His principal tenets may be reduced to the following. All things were in the beginning confusedly placed together, without order and without motion. The principle of things is at the same time one and multiple, which obtained the name of *homomerietes*, or similar particles, deprived of life. But there is beside this, from all eternity, another principle, namely an infinite and incorporeal spirit, who gave these particles a motion; in virtue of which, such as are homogeneous united, and such as were heterogeneous separated according to their different kinds. In this manner all things being put into motion by the spirit, and similar things being united to such as were similar, such as had a circular motion produced heavenly bodies, the lighter particles ascended, those which were heavy descended. The rocks of the earth, being drawn up by the force of the air, took fire, and became stars, beneath which the sun and moon took their stations. Thus he did not look upon the stars as divinities.

ANAXARCHUS, a philosopher of Abdera, highly esteemed by Alexander the Great. His end was peculiarly tragical: having the misfortune to fall into the hands of the enemy, they pounded him alive in a mortar.

ANAXIMANDER, a famous Greek philosopher, born at Miletus in the 42^d olympiad, in the time of Polycrates tyrant of Samos. He was the first who publicly taught philosophy, and wrote upon philosophical subjects. He carried his researches into nature very far for the time in which he lived. It is said, that he discovered the obliquity of the Zodiac, was the first who published a geographical table, invented the gnomon, and set up the first sundial in an open place at Lacedæmon. He taught, that infinity of things was the principal and universal element; that this infinite always preserved its unity, but that its parts underwent changes; that all things came from it; and that all were about to return into it. According to all appearance, he meant by this obscure and indeterminate principle the chaos of the other philosophers. He asserted, that there are an infinity of worlds; that the stars are composed of air and fire, which are carried in their spheres, and that these spheres are gods; and that the

earth is placed in the midst of the universe, as in a common centre. He added, that infinite worlds were the product of infinity, and that corruption proceeded from separation.

ANAXIMENES, born at Miletus, an eminent Greek philosopher, friend, scholar, and successor of Anaximander. He diffused some degree of light upon the obscurity of his master's system. He made the first principle of things to consist in the air, which he considered as immense or infinite, and to which he ascribed a perpetual motion. He asserted, that all things which proceeded from it, were definite and circumscribed; and that this air, therefore, was God; since the divine power resided in it and agitated it. Coldness and moisture, heat and motion, rendered it visible, and dressed it in different forms, according to the different degrees of its condensation. All the elements thus proceed from heat and cold. The earth was, in his opinion, one continued flat surface.

ANAXIMENES, the son of Aristocles of Lampfacus, an orator, the disciple of Diogenes the Cynic, and of Zoilus the railler against Homer. He was preceptor to Alexander of Macedon, and followed him to the wars. Alexander being incensed against the people of Lampfacus, they sent this philosopher to intercede for them. Alexander knowing the cause of his coming, swore that he would do the very reverse of whatever he desired of him. Anaximenes begged of him to destroy Lampfacus. Alexander, unwilling to break his oath, and not able to elude this stratagem, pardoned Lampfacus much against his will.

ANAXIMANDRIANS, in the history of philosophy, the followers of Anaximander; the most ancient of the philosophical atheists, who admitted of no other substance in nature but matter.

ANAZARBUS, (Pliny); ANAZARBA, (Stephanus); a town of Cilicia, on the river Pyramus, the birth place of Diofcorides, and of the poet Oppian. It was sometimes called *Casarea*, in honour either of Augustus or of Tiberius. The inhabitants are called *Anazarbeni*, (Pliny); and on coins *Anazarboi*, after the Greek idiom. It was destroyed by a dreadful earthquake in the year 525, along with several other important cities; but they were all repaired at a vast expence by the emperor Justin; who was so much affected with their misfortune, that, putting off the diadem and purple, he appeared for several days in sackcloth.

ANCARANO, a town of Italy, in the march of Ancona, situated in E. Long. 14. 54. N. Lat. 42. 48.

ANCASTER, a town of Lincolnshire, situated in W. Long. 30. N. Lat. 52. 30. It gives the title to a duke.

ANCENIS, a town of France, in the province of Britany. W. Long. 1. 9. N. Lat. 47. 20.

ANCESTORS, those from whom a person is descended in a straight line.

ANCHILOPS, a small tumour in the great angle of the eye, frequently degenerating into an abscess or fistula lachrymalis.

ANCHISES in fabulous history, a Trojan prince, descended from Dardanus, and the son of Capys. Venus made love to him in the form of a beautiful nymph; and bore him Æneas, the hero of Virgil's Æneid.

ANCHOR, (*anchora*, Lat. from *ἄγκυρα*, Greek,) a heavy

Anchor.

heavy, strong, crooked instrument of iron, dropped from a ship into the bottom of the water, to retain her in a convenient station in a harbour, road, or river.

The most ancient anchors are said to have been of stone; and sometimes of wood, to which a great quantity of lead was usually fixed. In some places, baskets full of stones, and sacks filled with sand, were employed for the same use. All these were let down by cords into the sea, and by their weight stayed the course of the ship. Afterwards they were composed of iron, and furnished with teeth, which, being fastened to the bottom of the sea, preserved the vessel immovable; whence *advisic* and *dentes* are frequently taken for anchors in the Greek and Latin poets. At first there was only one tooth, whence anchors were called *αγκυραμοι*; but in a short time the second was added by Eupalamus, or Anacharsis, the Scythian philosopher. The anchors with two teeth were called *αγκυροβολοι*, or *αγκυρομοι*; and from ancient monuments appear to have been much the same with those used in our days, only the transverse piece of wood upon their handles (the stock) is wanting in all of them. Every ship had several anchors, one of which, surpassing all the rest in bigness and strength, was peculiarly termed *ιψα* or *σacra*, and was never used but in extreme danger; whence *σacram anchoram solvere*, is proverbially applied to such as are forced to their last refuge.

The anchors now made are contrived so as to sink into the ground as soon as they reach it, and to hold a great strain before they can be loosened or dislodged from their station. They are composed of a shank, a stock, a ring, and two arms with their flukes. The stock, which is a long piece of timber fixed across the shank, serves to guide the flukes in a direction perpendicular to the surface of the ground; so that one of them sinks into it by its own weight as soon as it falls, and is still preserved steadily in that position by the stock, which, together with the shank, lies flat on the bottom. In this situation it must necessarily sustain a great effort before it can be dragged through the earth horizontally. Indeed this can only be effected by the violence of the wind or tide, or of both of them, sometimes increased by the turbulence of the sea, and acting upon the ship so as to stretch the cable to its utmost tension, which accordingly may dislodge the anchor from its bed, especially if the ground be soft and oozy, or rocky. When the anchor is thus displaced, it is said, in the sea-phrases, to *come home*.

That the figure of this useful instrument may be more clearly understood, let us suppose a long massy beam of iron erected perpendicularly, *b*, at the lower end of which are two arms, *d e*, of equal thickness with the beam (usually called the *shank*), only that they taper towards the points, which are elevated above the horizontal plane at an angle of thirty degrees, or inclined to the shank at an angle of sixty degrees; on the upper part of each arm (in this position) is a fluke or thick plate of iron, *g h*, commonly shaped like an isosceles triangle whose base reaches inwards to the middle of the arm. On the upper end of the shank is fixed the stock transversely with the flukes; the stock is a long beam of oak, *f*, in two parts, strongly bolted, and hooped together with iron rings. See also N° 2. Close above the stock is the ring *a*, to which the cable is fastened, or *bent*: the ring is curiously covered with a number of pieces of short rope, which are twisted a-

bout it, so as to form a very thick texture or covering called the *puddening*, and used to preserve the cable from being fretted or chafed by the iron.

Every ship has, or ought to have, three principal anchors, with a cable to each, *viz.* the sheet, *maitresse-ancre*, (which is the *ancora sacra* of the ancients); the best bower, *second ancre*; and small bower, *ancre d'assourche*, so called from their usual situation on the ship's bows. There are besides smaller anchors, for removing a ship from place to place in a harbour or river, where there may not be room or wind for failing; these are the stream-anchor, *ancre de toue*; the kedg and grappling, *grapin*: this last, however, is chiefly designed for boats.

At ANCHOR, the situation of a ship which rides by her anchor in a road or haven, &c. Plate XXII, fig. 1. N° 3. represents the fore-part of a ship as riding in this situation. See also BUOY-ROPE.

To *fish the ANCHOR*, to draw up the flukes upon the ship's side after it is catted. See the articles DAVIT and FISH.

To *sheer the ship to her ANCHOR*, is to steer the ship's head towards the place where the anchor lies when they are heaving the cable into the ship; that the cable may thereby enter the hauls with less resistance, and the ship advance towards the anchor with greater facility.

ANCHOR-GROUND is a bottom which is neither too deep, too shallow, nor rocky; as in the first the cable bears too nearly perpendicular, and is thereby apt to jerk the anchor out of the ground; in the second, the ship's bottom is apt to strike at low water, or when the sea runs high, by which she is exposed to the danger of sinking; and in the third, the anchor is liable to hook the broken and pointed ends of rocks, and tear away its flukes, whilst the cable, from the same cause, is constantly in danger of being cut through as it rubs on their edges.

ANCHOR, in architecture, a sort of carving, somewhat resembling an anchor. It is commonly placed as part of the enrichments of the bouldins of capitals of the Tuscan, Doric, and Ionic orders, and also of the bouldins of bed-mouldings of the Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately through the whole building.

ANCHORS, in heraldry, are emblems of hope, and are taken for such in a spiritual as well as a temporal sense.

ANCHORAGE, in law, is a duty upon ships for the use of the port or harbour where they cast anchor.

ANCHOVY, in ichthyology, the English name of the clupea encrasicolus. See CLUPEA.

ANCHUSA, ALKANET, a genus of the monogynia order, belonging to the pentandria class of plants; of which there are eight

Species. The officinalis, or greater garden-bugloss, is a native of France and of the warmer parts of Europe, but will thrive well enough in Britain; but the roots seldom continue longer than two years in this country, unless they happen to grow in rubbish, or out of an old wall, where they will live three or four years.

2. The angustifolia, or perennial wild borage, grows to the height of two feet when cultivated in gardens; but in those places where it grows wild is seldom more than a foot and an half high. The leaves of this sort are narrow; the spikes of flowers come out double, and have

Plate XXII.
Fig. 1. n° 1.

Anchor.
Anchor.

anchofa,
ancient.

have no leaves about them; the flowers are small, and of a red colour. The roots will continue two years in a poor soil. 3. The undulata, or Portugal buglofs, is a biennial plant, which grows to the height of two feet, and sends out many lateral branches. The flowers are of a bright blue colour, and grow in an imbricated spike. 4. The orientalis, or eastern buglofs, is a native of the Levant; but hardly enough to bear the open air in Britain, if it hath a dry sandy soil. It is a perennial plant, with long trailing branches which lie on the ground. The flowers are yellow, and about the size of the common buglofs, and there is a succession of these on the same plants great part of the year. 5. The virginiana, or puccoon, grows naturally in the woods of North America; and being an early plant, generally flowers before the new leaves come out on the trees; so that in some woods where it abounds, the ground seems entirely covered with its yellow flowers. It is a perennial plant, which seldom rises a foot high in good ground, but not above half that height where the soil is poor. The flowers grow in loose spikes upon smooth stalks. 6. The sempervirens, or ever-green borage, is a very hardy perennial plant, with weak trailing branches. It grows naturally in some parts of Britain and Spain. The flowers are blue, and come out between the leaves, on the spike, like the fourth sort. They appear during a great part of the year. 7. The cretica, or warted buglofs of Crete, is a low trailing annual plant, whose branches seldom extend more than six inches. The flowers are small, of a bright blue colour, and are collected into small bunches at the extremity of the branches. The plants perish soon after their seeds are ripe. 8. The tinctoria, or true alkanet, grows naturally in the Levant, but is equally hardy with the first species. The flowers grow in long spikes, coming out *imbricatum*, like the tiles of a house.

Culture. All the species of anchusa may be propagated by seeds; which should be sown, either in the spring or autumn, upon a bed of light sandy earth; and when the plants are strong enough to be removed, they must be planted on beds at two feet distance from one another, and watered, if the season requires it, till they have taken root; after which they will require no other care than to keep them free from weeds.

Medicinal Uses, &c. The flowers of the first species have obtained the name of *cordial* flowers; to which they have no other title than that they moderately cool and soften, without offending the palate or stomach; and thus, in warm climates, or in hot diseases, may in some measure refresh the patient. The root of the tinctoria is likewise used, not as possessed of any medicinal virtue, but on account of its imparting an elegant red colour to oily substances; so is frequently directed as a colouring ingredient for ointments, plasters, &c. As the colour is confined to the cortical part, the small roots are to be preferred, as having proportionably more bark than the large ones. The alkanet root which grows in England is greatly inferior to what comes from abroad.

ANCIENT, or ANTIEN, a term applied to things which existed long ago, thus we say, ancient nations, ancient customs, &c.

ANCIENT, sometimes denotes elderly, or of long standing, in opposition to young, or new; thus we say,

an ancient barrister, ancient buildings.

ANCIENT, in a military sense, denotes either the ensign or colours.

ANCIENT, in ships of war, the streamer or flag borne in the stern.

ANCILLON (David) a minister of the reformed church at Metz, where he was born the 17th of March 1617. He studied from the ninth or tenth year of his age in the Jesuits college, where he gave such proofs of his genius, that the heads of the society tried every means to draw him over to their religion and party; but he continued firm against their attacks. He went to Geneva in 1623; and studied divinity under Spanheim, Diodati, and Tronchin, who conceived a very great esteem for him. He left Geneva in April 1641, and offered himself to the synod of Charenton in order to take upon him the office of a minister: his abilities were greatly admired by the examiners, and the whole assembly were so highly pleased with him, that they gave him the church of Meaux, the most considerable then unprovided for. Here he acquired a vast reputation for his learning, eloquence, and virtue, and was even highly respected by those of the Roman-catholic communion. He returned to his own country in the year 1653, where he remained till the revocation of the edict of Nantes in 1685. He retired to Francfort after this fatal blow; and having preached in the French church at Hanau, the whole congregation were so edified by it, that they immediately called together the heads of the families, in order to propose that he might be invited to accept of being minister there. The proposition was agreed to; and he began the exercise of his ministry in that church about the end of the year 1685. His preaching made so great a noise at Hanau, that the professors of divinity, and the German and Dutch ministers, attended his sermons frequently: the count of Hanau himself, who had never before been seen in the French church, came thither to hear Mr Ancillon: they came from the neighbouring parts, and even from Francfort; people who understood nothing of French flocked together with great eagerness, and said they loved to see him speak. This occasioned a great jealousy in the two other ministers; which tended to make his situation uneasy. He therefore went to Berlin; where he met with a kind reception from his highness the elector, and was made minister of the city. Here he had the pleasure of seeing his eldest son made judge and director of the French in the same city, and his other son rewarded with a pension and entertained at the university of Francfort upon the Oder. He had likewise the satisfaction of seeing his brother made judge of all the French in the states of Brandenburg; and Mr Cayart his son-in-law, engineer to his electoral highness. He enjoyed these agreeable circumstances, and several others, till his death, which happened at Berlin the 3^d of September, 1692, when he was 75 years of age.—Mr Ancillon having got a considerable fortune by marriage, was enabled thereby to gratify his passion for books; his library was accordingly very curious and large, and he increased it every day with all that appeared new and important in the republic of letters, so that at last it was one of the noblest collections in the hands of any private person in the kingdom. He published a book, in quarto, in which the whole dispute concerning Traditions is fully examined: he also wrote

Ancient,
Ancillon.

Anclam
||
Ancony.

an apology for Luther, Zuinglius, Calvin, and Beza, and several other pieces.

ANCLAM, a strong town of Germany, in the circle of Upper Saxony, and duchy of Pomerania, remarkable for its excellent pastures. It is seated on the river Pene. E. Long. 14. 5. N. Lat. 54. 10.

ANCONA (marquise of), a province in the pope's territories in Italy. It lies between the gulph of Venice and mount Appennine, which bound it on the north; Abruzzo on the east; the duchy of Spoleto, and that of Urbino, on the west. The air is indifferent; but the soil is fruitful, particularly in hemp and flax; and there is great plenty of wax and honey. It contains several large towns, as Fermo, Loreto, Recanati, Macerata, Jesi, Tolentino, Ascoli, Ofimo, St Severino, Monte Alto, Camerino, and Ripatransone, which are all archiepiscopal or episcopal sees.

ANCONA, a sea-port town of Italy, the capital of the marquise of that name, and the see of a bishop. It was formerly the finest port in all Italy, being built by the emperor Trajan, about the year 115; but was almost ruined, and its trade lost: however, it has again begun to revive. Its harbour is the best in all the pope's dominions. The town lies round it on two hills; one of which is at the point of Cape St Cyriaco, from whence there is a delightful prospect. On the other stands the citadel, which commands the town and harbour. The streets of this city are narrow and uneven; and the public and private buildings inferior to those of the other great towns in Italy. The cathedral is a low dark structure; and though the front is covered with fine marble, the architecture has neither beauty nor regularity. The church of St Dominic, and that of the Franciscans, have each an excellent picture of Titian. The exchange, where the merchants meet, is a handsome square portico, in which is an equestrian statue of Trajan, who first built the port. At the four corners are four other statues. The triumphal arch of Trajan remains almost entire, with its inscription. The common people in this town are a little particular and fantastical in their dress, but the better sort follow the French mode. It is a great thorough-fare from the north of Italy to Loreto; which renders provisions very dear. The tide does not rise here above a foot, and near the Mediterranean it is scarce visible. E. Long. 15. 5. N. Lat. 43. 36.

ANCONES, in architecture, the corners or coins of walls, cross-beams, or rafters.—Vitruvius calls the *consoles* by the same name.

ANCONY, in the iron-works, a piece of half-wrought iron, of about three quarters of 100 weight, and of the shape of a bar in the middle, but rude and unwrought at the ends. The process for bringing the iron to this state is this: They first melt off a piece from a sow of cast-iron, of the proper size; this they hammer at the forge into a mass of two feet long, and of a square shape, which they call a *bloom*; when this is done, they send it to the finery, where, after two or three heats and workings, they bring it to this figure, and call it an *ancony*. The middle part beat out at the finery, is about three feet long, and of the shape and thickness the whole is to be; this is then sent to the chafery, and there the ends are wrought to the shape of the middle, and the whole made into a bar. See **BAR**.

ANCORARUM URBS, *Ἀγκυρῶν Πόλις*, a city in

the Nomos Aphroditopolites, towards the Red Sea; so called because there was in the neighbourhood a stone quarry, in which they hewed stone anchors (Ptolemy), before iron anchors came to be used. The gentilitious name is *Ancyropolites*, (Stephanus).

ANCOURT (Florent-Carton d'), an eminent French actor and dramatic writer, born at Fontainebleau, October 1661. He studied in the Jesuits college at Paris, under father De la Rue; who, discovering in him a remarkable vivacity and capacity for learning, was extremely desirous of engaging him in their order; but Ancourt's aversion to a religious life rendered all his efforts ineffectual. After he had gone through a course of philosophy, he applied himself to the civil law, and was admitted advocate at 17 years of age. But falling in love with an actress, he was induced to go upon the stage, and he married her. As he had all the qualifications necessary for the theatre, he soon greatly distinguished himself: and not being satisfied with the applause only of an actor, he began to write pieces for the stage; many of which had such prodigious success, that most of the players grew rich from the profits of them. His merit in this way procured him a very favourable reception at court; and Lewis XIV. shewed him many marks of his favour. His sprightly conversation and polite behaviour made his company agreeable to all the men of figure both at court and in the city, and the most considerable persons were extremely pleased to have him at their houses. Having taken a journey to Dunkirk, to see his eldest daughter who lived there, he took the opportunity of paying his compliments to the elector of Bavaria, who was then at Brussels: this prince received him with the utmost civility; and having detained him a considerable time, dismissed him with a present of a diamond valued at 1000 pistoles: he likewise rewarded him in a very generous manner, when, upon his coming to Paris, Ancourt composed an entertainment for his diversion. Ancourt began at length to grow weary of the theatre, which he quitted in Lent 1718, and retired to his estate of Courcelles le Roy, in Berry, where he applied himself wholly to devotion, and composed a translation of David's Psalms in verse, and a sacred tragedy, which were never printed. He died the 6th of December, 1726, being 65 years of age.—The plays which he wrote are 52 in all; most of which were printed separately at the time when they were first represented: they were afterwards collected into five volumes, then into seven, and at last into nine. This last edition is the most complete.

ANCRE, a small town of France, in Picardy, with the title of a marquise, seated on a little river of the same name. E. Long. 2. 45. N. Lat. 49. 59.

ANCUS MARTIUS, the fourth king of the Romans, succeeded Tullius Hostilius, 639 years before Christ. He defeated the Latins, subdued the Fidenates, conquered the Sabines, Volscii, and Veientes, enlarged Rome by joining to it mount Janicula, and made the harbour of Ostia. He died about 615 years before the Christian era.

ANCYLE, in antiquity, a kind of shield that fell, as was pretended, from heaven, in the reign of Numa Pompilius; at which time, likewise, a voice was heard declaring that Rome should be mistress of the world as long as she should preserve this holy buckler. It was kept

Ancorurum
||
Ancony.

Anyle
Anchylosis.

kept with great care in the temple of Mars, under the direction of twelve priests; and lest any should attempt to steal it, eleven others were made so like, as not to be distinguished from the sacred one. These ancylia were carried in procession every year round the city of Rome.

ANCYLE, in surgery. See ANCHYLOSIS.

ANCYLOBLEPHARON, (from *αγκυλῶ* bent, and *βλεφαρον* an eye-lid) is a disease of the eye, which closes the eye-lids. Sometimes the eye-lids grow together, and also to the tunica albuginea of the eye, from carelessness when there is an ulcer in these parts. Both these cases are called *ancyloblepharon* by the Greeks. This disorder must be distinguished from that coalition of the eye-lids which happens from viscid matter gluing them together. If the cohesion is on the cornea, the sight is inevitably lost. This hath sometimes happened in the small-pox. If there is only a growing together of the eye-lids, they may be separated with the specillum, and pledgets kept between them to prevent their re-union. If the eye-lids adhere to the eye, they are to be separated by a fine-edged knife; and their re-union is to be prevented by a proper use of injections, and lint placed between them, after dipping it in some proper liniment.

ANCYLOGLOSSUM, (from *αγκυλῶ* crooked, and *γλῶσσα* the tongue) is a contraction of the ligaments of the tongue. Some have this imperfection from their birth, others from some disease. In the first case, the membrane which supports the tongue is too short or too hard: in the latter, an ulcer under the tongue, healing and forming a cicatrix, is sometimes the cause; these speak with some difficulty. The *ancyloglossi* by nature are late before they speak; but when they begin, they soon speak properly. These we call *tongue-tied*. Mauriceau says, that in this case it is a small membranous production, which extends from the frænulum to the tip of the tongue, that hinders the child from sucking, &c. He justly condemns the cruel practice among nurses, of tearing this membrane with their nails; for thus ulcers are sometimes formed, which are of difficult cure: he advises to snip it with scissors in two or three places, taking care not to extend the points of the scissors so far as the frænulum. The instances rarely occur which require any kind of assistance; for if the child can thrust the tip of its tongue to the outer edge of its lip, this disease does not exist; and if the tongue is not greatly restrained, the frænulum will stretch by the child's sucking and crying. Besides, without an absolute necessity for it, an operation should not be admitted of; for, without great circumspection, by cutting the frænulum, the nerves passing there may be also cut, and then a loss of speech is the consequence. Sometimes the tongue is bound down with a fleshy substance: when that is the case, it should never be cut through, because a dangerous hemorrhage would follow, without any attending advantage; all that is advisable in this circumstance, is to desire the nurse, now and then, to stretch it gently by a light pressure on it with her finger-end. When, in consequence of delivering a child by the feet, a swelling is observed under the tongue, the nurse should be forbid to use any means, for the complaint will be increased thereby: this tumour will soon subside.

ANCYLOSIS, in surgery, implies a distortion or

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stiffness of the joints, caused by a settlement of the humours, or a distension of the nerves, and therefore remedies of a mollifying and relaxing nature are required.

ANCYRA, the capital of Galatia, (Livy, Pliny, Ptolemy); at no great distance from the river Halys, (Livy): said to be built by Midas, king of Phrygia, and to take its name from an anchor found there, (Pausanias). It was greatly improved by Augustus, deemed the second founder of it, as appears from the *Marmor Ancyrænum*. It is now called *Angura*, or *Angoura*. E. Long. 33°. Lat. 41. 20.

ANDBATÆ, in antiquity, a sort of gladiators, who, mounted on horseback or in chariots, fought hoodwinked, having a helmet that covered their eyes.

ANDALUSIA, is the most western province of Spain, having Estremadura and La Mancha on the north; the kingdom of Granada, the straits of Gibraltar, and the Ocean, on the east and south; and, on the west, the kingdom of Algarva in Portugal, from which it is separated by the river Guadiana. It is about 182 miles long, and 150 broad. The chief cities and towns are Seville the capital, Baeza, Gibraltar, Corduba, Cadiz, Medina Sidonia, Jaen, Port St Mary, &c. It is the best, most fruitful, and the richest part of all Spain. There is a good air, a serene sky, a fertile soil, and a great extent on the sea-coast fit for commerce.

NEW ANDALUSIA, a division of the province of Terra Firma in South America, whose boundaries cannot be well ascertained, as the Spaniards pretend a right to countries in which they have never established any settlements. According to the most reasonable limits, it extends in length 500 miles from north to south, and about 270 in breadth from east to west. The interior country is woody and mountainous, variegated with fine valleys that yield corn and pasturage. The produce of the country consists chiefly in dying-drugs, gums, medicinal roots, brazil-wood, sugar, tobacco, and some valuable timber. To this province also belonged five valuable pearl-fisheries. The capital of New Andalusia is Comana, Cumana, or New Corduba, situated in N. Lat. 9. 55. about nine miles from the north sea. Here the Spaniards laid the foundation of a town in the year 1520. The place is strong by nature, and fortified by a castle capable of making a vigorous defence; as appeared in the year 1670, when it was assaulted by the buccaners, who were repulsed with very great slaughter.

ANDAMAN, or ANDEMAN Islands, in the East Indies, situated about 80 leagues distance from Tanasserim on the coast of Siam. They are but little known; only the East India ships sometimes touch at them, and are supplied by the natives with rice, herbs, and fruits: the inhabitants are by some represented as an harmless inoffensive race of men, and by others as cannibals. E. Long. 92. 0. N. Lat. from 10° to 15°.

ANDANTI, in music, signifies, especially in thorough-basses, that the notes are to be played distinctly.

ANDECAVI, (Tacitus); ANDEGAVI, (Pliny); ANDES, (Cæsar); ANDI, (Lucan); a people of Gallia Celtica, having the Turones to the east, the Nannetes to the west, the Pictones to the south, and the Aurelii Cenomani to the north: now *Anjou*.

ANDEGAVI, or ANDEGAVUS, a town of Gallia Celtica, (Pliny, Ptolemy); now *Angiers*. Called *Andecavi*, (Tacitus.) W. Long. 30°. Lat. 47. 30.

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AN.

Aneyra
Andegavi.

Andely
|
Andes.

ANDELY, a town of Normandy in France, parted in two by a paved causeway. Here is a fountain to which pilgrims flock from all parts, to be cured of their disorders, on the feast-day of the faint to which it is dedicated. It is 20 miles S. E. of Rouen, and five N. W. of Paris. E. Long. 1. 30. N. Lat. 49. 20.

ANDENA, in old writers, denotes the swath made in mowing of hay, or as much ground as a man could stride over at once.

ANDEOL (St.), a town of France, in the Vivarez, five miles S. of St Viviers, whose bishop formerly resided there. E. Long. 2. 50. N. Lat. 44. 24.

ANDERAB, the most southern city of the province of Balkh, possessed by the Usbeck Tartars. It is very rich and populous, but a place of no great strength. The neighbouring mountains yield excellent quarries of lapis lazuli, in which the Bukhârs drive a great trade with Persia and India.—This city is situated at the foot of the mountains dividing the dominions of the Great Mogul and Persia from Great Bukharia. As there is no other way of crossing these mountains but by the road through this city, all travellers with goods must pay 4 per cent. On this account the Khan of Balkh maintains a good number of soldiers in the place.

ANDERNACHT, a city of Cologne, in the circle of the Lower Rhine. It is situated in a plain on the river Rhine; and is fortified with a wall, castle, and bulwarks. It has a trade in stone jugs and pitchers, which are sent to the mineral waters at Dunchtein. There are three monasteries here, and several churches. E. Long. 7. 4. N. Lat. 50. 27.

ANDERO (St.), a sea-port town in the bay of Biscay, in Old Castile, seated on a small peninsula. It is a trading town, and contains about seven hundred houses, two parish-churches, and four monasteries. Here the Spaniards build and lay up some of their men of war. W. Long. 4. 30. N. Lat. 43. 20.

ANDERSON (Sir Edmund), a younger son of an ancient Scotch family settled in Lincolnshire. He was some time a student of Lincoln college, Oxford; and removed from thence to the Inner Temple, where he applied himself diligently to the study of the law, and became a barrister. In the ninth of Queen Elizabeth, he was both lent and summer reader, and in the sixteenth double reader. He was appointed her majesty's serjeant at law in the nineteenth year of her reign; and some time after, one of the justices of assize. In 1582 he was made lord chief justice of the common pleas, and in the year following was knighted. He held his office to the end of his life, died in the year 1605, and was buried at Eyworth in Bedfordshire. He was an able, but punctilious lawyer; a scourge to the Puritans; and a strenuous supporter of the established church. His works are, 1. Reports of many principal cases argued and adjudged in the time of Queen Elizabeth, in the common bench. Lond. 1644, fol. 2. Resolutions and judgments on the cases and matters agitated in all the courts of Westminster, in the latter end of the reign of Queen Elizabeth. Published by John Goldsborough, Esq; Lond. 1653, 4to. Besides these, there is a manuscript copy of his Readings still in being.

ANDES, a great chain of mountains in South America, which running from the most northern part of

Peru to the straits of Magellan, between 3 and 4000 miles, are the longest and most remarkable in the world. The Spaniards call them the *Cordillera de los Andes*; they form two ridges, the lowermost of which is overpread with woods and groves, and the uppermost covered with everlasting snow. Those who have been at the top, affirm, that the sky is always serene and bright; the air cold and piercing; and yet so thin, that they were scarce able to breathe, and the respiration was much quicker than ordinary; and this is attended with reaching and vomiting; which, however, has been considered by some as merely accidental. When they looked downwards, the country was hid by the clouds that hovered on the mountain's sides. The mountains just mentioned, which have been frequently ascended, are much inferior in height to many others in this enormous chain. The following is the account given of the mountain called *Pichincha*, by the mathematicians sent by the kings of France and Spain to make observations in relation to the figure of the earth.

Soon after our artists arrived at Quito, they determined to continue the series of the triangles for measuring an arch of the meridian to the S. of that city: the company accordingly divided themselves into two bodies, consisting of French and Spaniards, and each retired to the part assigned them. Don George Juan and M. Godin, who were at the head of one party, went to the mountain of Pambamarca; while M. Bouguer, de la Condamine, and Don Ulloa, together with their assistants, climbed up to the highest summit of Pichincha. Both parties suffered extremely, as well from the severity of the cold, as from the impetuosity of the winds, which on these heights blow with incessant violence; difficulties the more painful, as they had been little used to such sensations. Thus in the torrid zone, nearly under the equinoctial, where it is natural to suppose they had most to fear from the heat, their greatest pain was caused by the excessiveness of the cold.

Their first scheme for shelter and lodging in these uncomfortable regions, was to pitch a field-tent for each company; but on Pichincha this could not be done from the narrowness of the summit: they were therefore obliged to be contented with a hut so small that they could hardly all creep into it. Nor will this appear strange, if the reader considers the bad disposition and smallness of the place, it being one of the loftiest crags of a rocky mountain, 100 fathoms above the highest part of the desert of Pichincha. Such was the situation of their mansion, which, like all the other adjacent parts, soon became covered with ice and snow. The ascent up this stupendous rock, from the base, or the place where the mules could come, to their habitation, was so craggy as only to be climbed on foot; and to perform it cost them four hours continual labour and pain, from the violent efforts of the body, and the subtilty of the air; the latter being such as to render respiration difficult.

The strange manner of living to which our artists were reduced during the time they were employed in a geometrical mensuration of some degrees of the meridian, may not perhaps prove unentertaining to the reader; and therefore the following account is given as a specimen of it. The desert of Pichincha, both with regard to the operations performed there, and its inconveniences, differing very little from others, an

Andes.

Andes.

idea may be very easily formed of the fatigues, hardships, and dangers, to which they were continually exposed during the time they were prosecuting the enterprise, with the conduct of which they had been honoured. The principal difference between the several deserts consisted in their greater or lesser distance from places where they could procure provisions; and in the inclemency of the weather, which was proportionate to the height of the mountains, and the season of the year.

They generally kept within their hut. Indeed they were obliged to do this, both on account of the intenseness of the cold, the violence of the wind, and their being continually involved in so thick a fog, that an object at six or eight paces was hardly discernible. When the fog cleared up, the clouds by their gravity moved nearer to the surface of the earth, and on all sides surrounded the mountains to a vast distance, representing the sea, with their rock like an island in the centre of it. When this happened, they heard the horrid noises of the tempests, which then discharged themselves on Quito and the neighbouring country. They saw the lightnings issue from the clouds, and heard the thunders roll far beneath them: and whilst the lower parts were involved in tempests of thunder and rain, they enjoyed a delightful serenity; the wind was abated, the sky clear, and the enlivening rays of the sun moderated the severity of the cold. But their circumstances were very different when the clouds rose: their thickness rendered respiration difficult; the snow and hail fell continually; and the wind returned with all its violence; so that it was impossible entirely to overcome the fears of being, together with their hut, blown down the precipice, on whose edge it was built, or of being buried under it by the daily accumulations of ice and snow.

The wind was often so violent in these regions, that its velocity dazzled the sight, whilst their fears were increased from the dreadful concussions of the precipice, caused by the fall of enormous fragments of rocks. These crashes were the more alarming, as no other noises are heard in these deserts: and during the night, their rest, which they so greatly wanted, was frequently disturbed by such sudden sounds. When the weather was any thing fair with them, and the clouds gathered about some of the other mountains which had a connection with their observations, so that they could not make all the use they desired of this interval of good weather, they left their hut to exercise themselves. Sometimes they descended to some small distance; and at others, amused themselves with rolling large fragments of rocks down the precipice; and these frequently required the joint strength of them all, though they often saw the same effected by the mere force of the wind. But they always took care in their excursions not to go so far out, but that on the least appearance of the clouds gathering about their cottage, which often happened very suddenly, they could regain their shelter. The door of their hut was fastened with thongs of leather, and on the inside not the smallest crevice was left unstoppered; beside which, it was very compactly covered with straw: but, notwithstanding all their care, the wind penetrated through. The days were often little better than the nights; and all the light they enjoyed was that of a lamp or two, which they kept continually burning.

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Though their hut was small, and crowded with inhabitants, beside the heat of the lamps; yet the intenseness of the cold was such, that every one of them was obliged to have a chafing-dish of coals. These precautions would have rendered the rigour of the climate supportable, had not the imminent danger of perishing by being blown down the precipice roused them, every time it snowed, to encounter the severity of the outward air, and fall out with shovels to free the roof of their hut from the masses of snow which were gathering on it. Nor would it, without this precaution, have been able to support the weight. They were not indeed without servants and Indians; but these were so benumbed with the cold, that it was with great difficulty they could get them out of a small tent, where they kept a continual fire. So that all our artists could obtain from them was to take their turns in this labour; and even then they went very unwillingly about it, and consequently performed it slowly.

It may easily be conceived what this company suffered from the asperities of such a climate. Their feet were swelled; and so tender, that they could not even bear the heat; and walking was attended with extreme pain. Their hands were covered with chilblains; their lips swelled and chapped; so that every motion in speaking, or the like, drew blood; consequently they were obliged to strict taciturnity, and little disposed to laugh, as, by causing an extension of the lips, it produced such fissures as were very painful for two or three days after.

Their common food in this inhospitable region was a little rice boiled with some flesh or fowl, procured from Quito; and, instead of fluid water, their pot was filled with ice; they had the same resource with regard to what they drank; and while they were eating, every one was obliged to keep his plate over a chafing-dish of coals, to prevent his provisions from freezing. The same was done with regard to the water. At first they imagined the drinking strong liquors would diffuse a heat through the body, and consequently render it less sensible of the painful sharpness of the cold; but, to their surprise, they felt no manner of strength in such liquors, nor were they any greater preservative against the cold than the common water.

At the same time they found it impossible to keep the Indians together. On their first feeling of the climate, their thoughts were immediately turned on deserting their masters. The first instance they had of this kind was so unexpected, that, had not one, of a better disposition than the rest, staid and acquainted them of their design, it might have proved of very bad consequence. The affair was this: There being on the top of the rock no room for pitching a tent for the Indians, they used every evening to retire to a cave at the foot of the mountain; where, beside a natural diminution of the cold, they could keep a continual fire; and, consequently, enjoyed more comfortable quarters than their masters. Before they withdrew at night, they fastened, on the outside, the door of the hut, which was so low that it was impossible to go in or out without stooping; and as every night the hail and snow which had fallen formed a wall against the door, it was the business of one or two of the Indians to come early and remove this obstruction. For though the negro servants were lodged in a little tent, their hands and feet were so

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covered with chilblains, that they would rather have suffered themselves to have been killed than move. The Indians therefore came constantly up to dispatch this work betwixt nine or ten in the morning; but they had not been there above four or five days, when they were not a little alarmed to see ten, eleven, and twelve o'clock come, without any news of their labourers; when they were relieved by the honest servant mentioned above, who had withstood the seduction of his countrymen, and informed his masters of the desertion of the four others. As soon as the snow was cleared away from the door, they dispatched the Indian to the corregidor of Quito, who with equal dispatch sent other Indians, threatening to chastise them severely if they were wanting in their duty.

But the fear of punishment was not sufficient to induce them to support the rigour of this situation; for within two days they deserted. The corregidor therefore, to prevent any other inconvenience, sent four Indians under the care of an alcade, and gave orders for their being relieved every fourth day.

Twenty-three tedious days our artists spent on this rock, viz. to the 6th of September, and even without any possibility of finishing their observations of the angles: for, when it was fair and clear weather with them, the others, on whose summits the signals which formed the triangles for measuring the degrees of the meridian, were hid in the clouds; and when those were clear, Pichincha was involved in clouds. It was therefore necessary to erect their signals in a lower situation, and in a more favourable region. This however did not produce any change in their habitation till the beginning of December; when, having finished the observations which particularly concerned Pichincha, they proceeded to others; but with no abatement either of inconveniences, cold, or fatigue; for the places where they made their observations being necessarily on the highest parts of the deserts, the only respite in which they enjoyed some little ease, was during the short interval of passing from one to the other.

In all their stations subsequent to that on Pichincha, during their fatiguing mensuration of the degrees of the meridian, each company lodged in a field-tent, which, though small, they found less inconvenient than the hut on Pichincha; though at the same time they had more trouble, being oftener obliged to clear it from the snow, as the weight of it would otherwise have demolished the tent. At first, indeed, they pitched it in the most sheltered places; but on taking a resolution that the tents themselves should serve for signals, to prevent the inconvenience of having others of wood, they removed them to a more exposed situation, where the impetuosity of the winds sometimes tore up the piquets, and blew them down.

Tho' this mountain is famous for its great height, it is considerably lower than the mountain of Cotopaxi: but it is impossible to conceive the coldness of the summit of the last mentioned mountain, from that felt on this; since it must exceed every idea that can be formed by the human mind, tho' they are both seated in the midst of the torrid zone. In all this range of mountains, there is said to be a constant inferior boundary, beyond which the snow never melts: this boundary, in the midst of the torrid zone, is said by some to be 2434 fathoms above the level of the sea; by others, only 2400

feet. The snow indeed falls much lower, but then it is subject to be melted the very same day. It is affirmed, that there are in the Andes 16 volcanoes or burning mountains, which throw out fire and smoke with a terrible noise. The height of Chimborazo, said to be the highest peak of the Andes, has been determined by geometrical calculations to be 20,282 feet. But the great differences between the calculators of the height of mountains in other parts of the world, must very much diminish the credit of such calculations. Instances of this we have already given under the article *ÆTNA*. No less remarkable are the differences concerning the height of the peak of Teneriffe; which, according to the calculations of Varenus, is three miles and three quarters, or 19,800 feet; according to those of Dr Herberden, it is only 15,396 feet; and according to those of M. Feuille, is no more than 13,128 feet. From these specimens, we can scarce avoid concluding, that all the methods hitherto invented for calculating the exact height of mountains are insufficient.

As all or most rivers have their source in mountains, it is no wonder a great number run down the sides of the Andes. Some hurry along with a prodigious rapidity; while others form beautiful cascades, or run thro' holes in rocks, which look like bridges of a stupendous height. There is a public road thro' the mountains, 1000 miles in length, part of which runs from Quito to Cusco.

ANDES, a hamlet of Mantua in Italy, the birth-place of Virgil. Hence the epithet *Andinus*, (Silvius Italicus). Now called *Pietola*, two miles to the west of Mantua.

ANDETRIUM; ANDRETRIUM, (Strabo); ANDERCIUM, or ANDRECIUM, (Ptolemy); an inland town of Dalmatia. The genuine name is *Andetrium*, (Inscription). It is described as situated near Salone, on a naturally strong and inaccessible rock, surrounded with deep valleys, with rapid torrents; from which it appears to be the citadel now called *Chiffa*. E. Long. 17. 46. Lat. 43. 20.

ANDEUSE, a city of Languedoc in France, situated in E. Long. 3. 40. and N. Lat. 43. 45.

ANDOMADUNUM; ANDOMATUNUM, (Ptolemy); and ANTEMATUNUM, (Antonine); CIVITAS LINGONUM, (Tacitus); a city of Gallia Belgica; now *Langres* in Champagne, situated on an eminence (which seems to justify the termination *dunum*), on the borders of Burgundy, at the springs of the Marne. Tacitus calls an inhabitant *Lingon*. E. Long. 5. 22. N. Lat. 48. 0.

ANDOVER, a large market-town in Hampshire, on the London road. It is seated on a branch of the river Test, and sends two members to parliament. It has several inns, which afford good accommodation for travellers; and has a market on Saturday, well stocked with provisions. It is governed by a bailiff, a steward, a recorder, ten approved men, and twenty-two capital burgesses, who yearly chuse the bailiff, and he elects two sergeants at mace to attend him. The living is a vicarage, valued at 171 l. 4 s. 4 d. in the king's books. W. Long. 0. 56. N. Lat. 51. 20.

ANDRACHNE, BASTARD ORPINE; a genus of the gymnandria order, belonging to the monœcia class of plants; of which there are three

Species. 1. The telephoides, or herbaceous trailing andrachne,

Andes
Andrachne.

drachne andrachne, is a low plant, whose branches trail upon the ground. The leaves are small, of an oval shape, smooth, and of a sea-green colour. It is found wild in some parts of Italy and the Archipelago; but is a plant of no great beauty, and therefore seldom cultivated. 2. The fruticosa, or shrubby batard opine, is a native of China and some places of America, where it rises 12 or 14 feet high. The leaves are spear-shaped, pointed, and smooth; and under them are produced the footstalks of the flowers, which are small, and of an herbaceous white colour. 3. The arborea, with a tree-like stalk. This species was discovered by the late Dr William Houston, growing naturally at Campeachy; it has a strong woody stem, which rises more than 20 feet high, and sends out many branches on every side. This has not yet flowered in Britain.—A fourth sort is also mentioned by Mr Millar as raised by him from seeds sent from Jamaica. It agrees in general with the third sort; but the leaves are somewhat like the laurel, only much larger.

Culture. The first species may be raised, by sowing the seeds in March, on a moderate hot-bed. The plants may be removed into small pots, and plunged into another very moderate hot-bed, to bring them forward; but in mild weather they should have plenty of air admitted to them, and be frequently refreshed with water. In June they will produce flowers, and the seeds will ripen in August and September.—The other species are very tender, and therefore must be kept constantly in the bark-stove. It is very difficult to procure good seeds of these sorts; the covers often containing nothing, though they appear very fair outwardly. Of all the seeds sent over by Dr Houston, only one was found to contain a kernel, so that only one plant was produced.

ANDRAPODISMUS, in ancient writers, the selling of persons for slaves. Hence also *andrapodister*, a dealer in slaves, more particularly a kidnapper, who steals men or children to sell them; a crime for which the Thesalians were noted.

ANDRAPODOCAPELI, in antiquity, a kind of dealers in slaves. The *andrapodocapeli* had a particular process for taking off moles and the like disfigurements on the faces of the slaves they kept for sale, by rubbing them with bran. At Athens, several places in the forum were appointed for the sale of slaves. Upon the first day of every month, the merchants called *ἀνδραποδοκαπηλῆς* brought them into the market, and exposed them to sale; the crier standing upon a stone erected for that purpose, called the people together.

ANDREA (St), a small village on the Malabar coast in the East-Indies, founded originally by the Portuguese. It takes its name from a church dedicated to St Andrew, and served by the priests of St Thomas.—On the shore of St Andrea, about half a league out in the sea, lies Mud-bay, a place which few in the world can parallel. It is open to the wide ocean, and has neither island nor bank to break the force of the billows, which come rolling with great violence from all parts, in the south-west monsoons: but on this bank of mud they lose themselves in a moment; and ships lie on it as secure as in the best harbour, without motion or disturbance. It reaches about a mile along shore, and has been observed to shift its place from the

northward about three miles in 30 years.—From St Andrea to Kranganor, about twelve leagues to the south, the water has the bad property of causing swellings in the legs of those who drink it constantly. Some it affects in one leg, and some in both. It causes no pain, but itching; nor does the swelled leg seem heavier to the owner than the small one, though some have been seen a yard in circumference at the ankle.—The Romish legends impute the cause of this distemper (for which no preventative or cure hath been hitherto found) to a curse laid by St Thomas upon his murderers and their posterity; though, according to the Romans themselves, St Thomas was killed by the Tilinga priests at Meliaphôr, on the coast of Coromandel, about 400 miles distant, and where the natives have not this distemper.

ANDREAS (John), a celebrated canonist in the 14th century, was born at Mugello, near Florence; and was professor of canon-law at Padua, Pisa, and afterwards at Bologna. It is said that he macerated his body with fasting; and lay upon the bare ground every night for 20 years together, covered only with the skin of a bear: Andreashada beautiful daughter, named *Novella*, whom he loved extremely: and he is said to have instructed her so well in all parts of learning, that when he was engaged in any affair which hindered him from reading lectures to his scholars, he sent his daughter in his room; and left her beauty should prevent the attention of the hearers, she had a little curtain drawn before her. To perpetuate the memory of this daughter, he intitled his commentary upon the Decretals of Gregory IX. the *Novella*. He married her to John Calderinus, a learned canonist. The first work of Andreas was his Gloss upon the sixth Book of the Decretals, which he wrote when he was very young. He wrote also Glosses upon the Clementines; and a Commentary in *regulas Sexti*, which he intitled *Mercuriales*, because he either engaged in it on Wednesdays (*diebus Mercurii*), or because he inserted his Wednesdays disputes in it. He enlarged the Speculum of Durant, in the year 1347. This is all which Mr Bayle mentions of his writings, tho' he wrote many more. Andreas died of the plague at Bologna, in 1348, after he had been a professor 45 years; and was buried in the church of the Dominicans. Many eulogiums have been bestowed upon him. He has been called *archidoxitor decretorum*: In his epitaph, *Rabbi doctorum; lux, censor, normaque morum*; "Rabbi of the doctors, the light, censor, and rule of manners." And it is said, that pope Boniface called him *lumen mundi*, "the light of the world."

ANDREAS (John) was born a Mahometan, at Xativa in the kingdom of Valencia, and succeeded his father in the dignity of alcafi of that city. He was enlightened with the knowledge of the Christian religion by being present at a sermon in the great church of Valencia on the day of Assumption of the blessed Virgin, in the year 1487. Upon this he desired to be baptized; and, in memory of the calling of St John and St Andrew, he received the name John Andreas. "Having received holy orders (says he), and, from an alcafi and a slave of Lucifer, become a priest and minister of Christ; I began, like St Paul, to preach and publish the contrary of what I had erroneously believed and asserted; and, with the assistance of Almighty God,

Andreas
(John.)

Andreas
(John)
Andrelinus

I converted at first a great many souls of the Moors, who were in danger of hell, and under the dominion of Lucifer, and conducted them into the way of salvation. After this, I was sent for by the most catholic prince, king Ferdinand, and queen Isabella, in order to preach in Granada to the Moors of that kingdom, which their majesties had conquered: by God's blessing on my preaching, an infinite number of Moors were brought to abjure Mahomet, and to turn to Christ. A little after this, I was made a canon by their grace; and sent for again by the most Christian queen Isabella to Arragon, that I might be employed in the conversion of the Moors of those kingdoms, who still persisted in their errors, to the great contempt and dishonour of our crucified Saviour, and the prodigious loss and danger of all Christian princes. But this excellent and pious design of her majesty was rendered ineffectual by her death." At the desire of Martin Garcia, bishop of Barcelona, he undertook to translate from the Arabic, into the language of Arragon, the whole law of the Moors; and after having finished this undertaking, he composed his famous work of *The Confusion of the Sect of Mahomet*: it contains twelve chapters, wherein he has collected the fabulous stories, impostures, forgeries, brutalities, follies, obscenities, absurdities, impossibilities, lies, and contradictions, which Mahomet, in order to deceive the simple people, has dispersed in the writings of that sect, and especially in the alcoran, which, as he says, was revealed to him in one night by an angel, in the city of Meke; though in another place he contradicts himself, and affirms that he was 20 years in composing it. Andreas tells us, he wrote this work, that not only the learned amongst Christians, but even the common people might know the different belief and doctrine of the Moors; and on the one hand might laugh and ridicule such insolent and brutal notions, and on the other might lament their blindness and dangerous condition. This book, which was published at first in Spanish, has been translated into several languages; all those who write against the Mahometans, quote it very much.

ANDREINI (Isabella), a native of Padua, was an excellent poetess, and one of the best comedians in Italy, towards the beginning of the 17th century. The Intenti of Pavia thought they did their society an honour by admitting her a member of it; and she, in acknowledgment of this honour, never forgot to mention amongst her titles that of *Academia Infanta*: her titles were these, "Isabella Andreini, comica gelosa, academica infanta, detta l'accesia." She was also a woman of extraordinary beauty; which, added to a fine voice, made her charm both the eyes and ears of the audience. She died of a miscarriage, at Lyons, the 10th of June, 1604, in the 42^d year of her age. Her death being a matter of general concern and lamentation, there were many Latin and Italian elegies printed to her memory: several of these pieces were placed before her poems in the edition of Milan, in 1605. Besides her sonnets, madrigals, songs, and eclogues, there is a pastoral of hers intitled *Myrtilla*, and letters, played at Venice in 1610. She sung extremely well, played admirably on several instruments, understood the French and Spanish languages, and was not unacquainted with philosophy.

ANDRELINUS (Publius Faustus), born at Forl

in Italy. He was a long time professor of poetry and philosophy in the university of Paris. Lewis XII. of France made him his poet laureat; and Erasmus tells us he was likewise poet to the queen. His pen was not wholly employed in making verses; for he wrote also moral and proverbial letters in prose, which were printed several times. His poems, which are chiefly in Latin, are inserted in Vol. I. of the *Delicie Poetarum Italarum*. Mr De la Monnoie tells us, "that Andrelinus, when he was but 22 years old, received the crown of laurel: That his love-verses, divided into four books, intitled *Livia*, from the name of his mistress, were esteemed so fine by the Roman Academy, that they adjudged the prize of the Latin elegy to the author." He died in 1518. This author's manner of life was not very exemplary; yet he was so fortunate, says Erasmus, that though he took the liberty of rallying the divines, he was never brought into trouble about it.

ANDREW (St), the apostle, born at Bethsaida in Galilee, brother to Simon Peter: he was a zealous preacher of the gospel in several countries; and sealed it with his blood at Patre, a city of Achaia, suffering martyrdom with great heroism, A. D. 69.

ANDREW, or *Knights of St Andrew*, an order of knights, more usually called the order of the thistle.*

Knights of St Andrew, is also an order instituted by Peter the Great of Muscovy in 1698; the badge of which is a golden medal, on one side whereof is represented St Andrew's cross, with these words, *Cazar Pierre monarque de tout la Russie*. This medal, being fastened to a blue ribbon, is suspended from the right shoulder.

St Andrew's Cross, one in form of the letter X*.

St Andrew's Day, a festival of the Christian church, celebrated on the 30th of November, in honour of the apostle St Andrew.

ANDREWS (St), a town of Fifeshire in Scotland, once the metropolis of the Pictish kingdom, lying in W. Long. 2. 25. N. Lat. 56. 18. If we may credit legend, St Andrews owes its origin to a singular accident. St Regulus, (or *St Rule*, as he is likewise called,) a Greek of Achaia, was warned by a vision to leave his native country, and visit Albion, an isle placed in the remotest part of the world; and to take with him the arm-bone, three fingers, and three toes, of St Andrew. He obeyed, and set sail with his companions, but had a very tempestuous passage. After being tossed for some time on a stormy sea, he was at last shipwrecked on the coasts of Otholania, in the territories of Hergulfus king of the Picts, in the year 370. On hearing of the arrival of the strangers, with their precious reliques, the king immediately gave orders for their reception, afterwards presenting the saint with his own palace, and building near it the church, which still bears the name of *St Regulus*.

At this time the place was styled *Mucrofi*, or the *land of boars*; all round was forest, and the lands bestowed on the Saint were called *Byrebid*. The boars equalled in size the ancient Erymanthian; as a proof of which, two tusks, each sixteen inches long and four thick, were chained to the altar of St Andrews. St Regulus changed the name to *Kilrymont*; and established here the first Christian priests of the country, called *Culdees*. This church was supreme in the kingdom of the Picts; Ungus having granted to God and St Andrew,

Andrew
(St)
Andrews
(St.)

* See *Thistle*

* See *Cross*

Andrews
(St.)

drew, that it should be the head and mother of all the churches in his dominions. He also directed that the cross of St Andrew should become the badge of the country. In 518, after the conquest of the Picts, he removed the episcopal see to St Andrews, and the bishop was styled *maximus Scotorum episcopus*. In 1441, it was erected into an archbishopric by Sextus IV. at the intercession of James III. In 1606, the priory was suppressed; and, in 1617, the power of election was transferred to eight bishops, the principal of St Leonard's college, the arch-deacon, the vicars of St Andrews, Leuchars, and Coupar.

The town of St Andrews was erected into a royal borough by David I. in the year 1140, and their privileges afterwards confirmed. The charter of Malcolm II. is preserved in the tolbooth; and appears written on a bit of parchment, but the contents equally valid with what would at this time require whole skins. Here also are kept the silver keys of the city; which, for form's sake, are delivered to the king, if he should visit the place, or to a victorious enemy, in token of submission. In this place, likewise, is to be seen the monstrous ax which, in 1646, took off the heads of Sir Robert Spotwood and other distinguished loyalists. The town underwent a siege in 1337; at which time it was possessed by the English, and other partizans of Baliol; but the loyalists, under the earls of March and Fife, made themselves masters of it in three weeks, by the help of their battering machines.

St Andrews is now greatly reduced in the number of its inhabitants; at present scarcely exceeding 2000. It is impossible to ascertain the sum when it was the seat of the primate: all that can be known is, that during the period of its splendor, there were between 60 and 70 bakers; but now 9 or 10 are sufficient for the place. It is a mile in circuit, and contains three principal streets. On entering the west port, a well-built street, straight, and of a vast length and breadth, appears; but so grass-grown, and presenting such a dreary solitude, that it forms the perfect idea of having been laid waste by the pestilence.

The cathedral of St Andrews was founded by bishop Arnold in 1161, but did not attain its full magnificence till 1318. Its length from east to west was 370 feet; that of the transept, 322. But tho' this vast pile was 157 years in building, John Knox, in June 1559, effected its demolition in a single day; and so effectually has it been destroyed, that nothing now remains but part of the east and west ends, and of the south side.

Near the east end is the chapel of St Regulus; the tower of which is a lofty equilateral triangle, of 20 feet each side, and 103 feet high; the body of the chapel remains, but the two side-chapels are ruined. The arches of the windows and doors are round, and some even more than semicircles; an undoubted proof of their antiquity.

The priory was founded by Alexander I. in 1122; and the monks (canons regular of St Augustine) were brought from Scone, in 1140, by Robert, bishop of this see. By an act of parliament, in the time of James I. the prior had precedence of all abbots and priors, and on the days of festival wore a mitre and all episcopal ornaments. Dependent on this priory were those of Lochleven, Portmoak, Monimusk, the isle of May, and

Pittenweem, each originally a seat of the Cukices.

The revenues of the house were vast, viz. In money 2237 *l.* 2 *s.* 10 *d.*; 38 chaldrons, 1 boll, 3 firlots of wheat; 132 ch. 7 bolls of bear; 114 ch. 3 bolls, 1 peck of meal; 151 ch. 10 bolls, 1 firlot, 1 peck and a half of oats; 3 ch. 7 bolls of peas and beans: 480 acres of land also belonged to it.

Nothing remains of the priory except the walls of the precinct, which shew its vast extent. In one part is a most artless gateway, formed only of seven stones. This inclosure begins near the cathedral, and extends to the shore.

The other religious houses were, one of Dominicans, founded, in 1274, by bishop Wishart; another of Observantines, founded by bishop Kennedy, and finished by his successor Patrick Graham in 1478; and, according to some, the Carmelites had a fourth.

Immediately above the harbour stood the collegiate church of Kirk-heugh, originally founded by Constantine III. who, retiring from the world, became here a Cukdice. From its having been first built on a rock, it was styled, *Præpositura Sanctæ Mariæ de rupe*.

On the east side of the city are the poor remains of the castle, on a rock overlooking the sea. This fortress was founded, in 1401, by bishop Trail, who was buried near the high altar of the cathedral, with this singular epitaph:

Hic fuit ecclesiæ directæ columna, fenestra
Lucida, thuribulum redolens, campana sonora.

This castle was the residence of cardinal Beaton; who, after the death of George Wishart, apprehending some danger, caused it to be fortified so strongly as to be at that time deemed impregnable. In this fortress, however, he was surprized and assassinated by Norman Leslie with 15 others. They seized on the gate of the castle early in the morning of May 29, 1546; it having been left open for the workmen who were finishing the fortifications: and having placed centinels at the door of the cardinal's apartment, they awakened his numerous domestics one by one; and, turning them out of the castle, they without violence, tumult, or offering an injury to any other person, inflicted on Beaton the death he justly merited. The conspirators were immediately besieged in this castle by the regent, earl of Arran; and notwithstanding they had acquired no greater strength than 150 men, they resisted all his efforts for five months. This, however, was owing to the unskilfulness of the besiegers more than to the strength of the place or the valour of the besieged; for in 1547 the castle was reduced and demolished. The entrance of it is still to be seen; and the window is shewn, out of which it is said the cardinal leaned to glut his eyes with the cruel martyrdom of George Wishart, who was burnt on a spot beneath.

In the church of St Salvador is a most beautiful tomb of bishop Kennedy, who died, an honour to his family, in 1466. The Gothic work is uncommonly elegant. Within the tomb were discovered six magnificent maces, which had been concealed here in troublesome times. One was given to each of the other three Scotch universities, and three are preserved here. In the top is represented our Saviour; around are angels, with the instruments of the passion.

With these are shewn some silver arrows, with large silver plates affixed to them, on which are inscribed the

Andrews
(St.)

Andro-
gynes
Androides.

self with debilitating this double being, by disjoining the male from the female, and leaving each half to subsist with its own powers alone. He assigned to Apollo the task of repolishing these two half bodies, and of extending their skins so that their whole surface might be covered. Apollo obeyed, and fastened it at the *umbilicus*: If this half should still rebel, it was once more to be subdivided by another section, which would only leave it one of the parts of which it was then constituted; and even this fourth of a man was to be annihilated, if it should persist in its obstinacy and mischief. The idea of these *androgynes* might well be borrowed from a passage in Moses, where that historian of the birth and infancy of nature describes Adam as calling *Eve bone of his bone and flesh of his flesh*. However this may be, the fable of Plato has been used with great ingenuity by a French poet, who has been rendered almost as conspicuous by his misfortunes as by his verses. With the ancient philosopher, he attributes the propensity which attracts one of the sexes towards the other, to the natural ardour which each half of the *androgynes* feels for reunion; and their inconstancy, to the difficulty which each of the separated parts encounters in its efforts to recover its proper and original half. If a woman appears to us amiable, we instantly imagine her to be that moiety with whom we should only have constituted one whole, had it not been for the infolenace of our original double-sexed progenitor:

The heart, with fond credulity impress'd,
Tells us the half is found, and hopes for rest;
But 'tis our curse, that sad experience shows,
We neither find our half, nor gain repose.

ANDROGYNOUS, in zoology, an appellation given to animals which have both the male and female sex in the same individual.—In botany, the term is applied to such plants as bear both male and female flowers on the same root.

ANDROIDES, in mechanics, a human figure, which, by certain springs or other movements, is capable of performing some of the natural motions of a living man. The motions of the human body are more complicated, and consequently more difficult to be imitated, than those of any other creature; whence the construction of an *androider*, in such a manner as to imitate any of these actions with tolerable exactness, is justly supposed to indicate a greater skill in mechanics than any other piece of workmanship whatever.

A very remarkable figure of this kind appeared in Paris, in the year 1738. It represented a flute-player, and was capable of performing many different pieces of music on the German flute; which, considering the difficulty of blowing that instrument, the different contractions of the lips necessary to produce the distinctions between the high and low notes, and the complicated motions of the fingers, must appear truly wonderful.

This machine was the invention of M. Vaucanson, member of the Royal Academy of Sciences; and a particular description of it was published in the Memoirs of the Academy for that year: but as the description there given behaved to be not only unentertaining, but absolutely unintelligible, to a great number of readers, we must content ourselves with giving an account only of its general principles, and the method by which the air was conducted to, and afterwards modified in, the body of the figure, so as to produce the surprising

Androider.

effects above mentioned.

The figure itself was about five feet and an half in height, situated at the end of an artificial rock, and placed upon a square pedestal four feet and an half high, and three and an half broad. The air entered the body by three pipes separated one from the other. It was conveyed to them by nine pair of bellows, three of which were placed above, and six below. These were made to expand and contract regularly in succession, by means of an axis of steel turned round by some clock-work. On this axis were different protuberances at proper distances, to which were fixed cords thrown over pulleys, and terminating in the upper boards of the bellows, so that, as the axis turned, these boards were alternately raised and let down. A contrivance was also used to prevent the disagreeable hissing fluttering noise usually attending the motion of bellows. This was by making the cord, by which the bellows was moved, press, in its descent, upon one end of a smaller lever, the other end of which ascending forced open the small leather valve that admitted the air, and kept it so, till, the cord being relaxed by the descent of the upper board, the lever fell, and the air was forced out. Thus the bellows performed their functions constantly without the least hissing or other noise by which it could be judged in what manner the air was conveyed to the machine. The upper boards of three of the pairs of bellows were pressed down by a weight of four pounds, that of three others by a weight of two pounds, and those of the three remaining ones by nothing but their own weight.

The three tubes, by which the air entered, terminated in three small reservoirs in the trunk of the figure. There they united, and ascending towards the throat, formed the cavity of the mouth, which terminated in two small lips adapted in some measure to perform their proper functions. Within this cavity also was a small moveable tongue; which by its play, at proper periods, admitted the air, or intercepted its passage to the flute.

The fingers, lips, and tongue, received their proper directions by means of a steel cylinder turned by clock-work. It was divided into 15 equal parts, which by means of pegs, pressing upon the ends of 15 different levers, caused the other extremities to ascend. Seven of these levers directed the fingers, having wires and chains affixed to their ascending extremities, which, being attached to the fingers, caused them ascend in proportion as the other extremity was pressed down by the motion of the cylinder, and *vice versa*. Thus the ascent or descent of one end of a lever produced a similar ascent or descent in the corresponding finger, by which one of the holes of the flute was occasionally opened or stopped, as by a living performer. Three of the levers served to regulate the ingress of the air, being contrived so as to open and shut, by means of valves, the three reservoirs of air above mentioned, so that more or less strength might be given, and a higher or lower note produced, as occasion required. The lips were, by a similar mechanism, directed by four levers, one of which opened them, to give the air a freer passage; the other contracted them; the third drew them backward; and the fourth pushed them forward. The lips were projected upon that part of the flute which receives the air; and, by the different motions already mentioned, modified the tone in a proper manner.—

The

Androïdes. The remaining lever was employed in the direction of the tongue, which it easily moved so as to shut or open the mouth of the flute.

Thus we see how all the motions necessary for a German-flute-player could be performed by this machine; but a considerable difficulty still remains, namely, how to regulate these motions properly, and make each of them follow in just succession. This, however, was effected by the following simple method. The extremity of the axis of the cylinder was terminated on the right side by an endless screw, consisting of twelve threads, each placed at the distance of a line and an half from the other. Above this screw was fixed a piece of copper, and in it a steel pivot, which, falling in between the threads of the screw, obliged the cylinder to follow the threads, and, instead of turning directly round, it was continually pushed to one side. Hence, if a lever was moved, by a peg placed on the cylinder, in any one revolution, it could not be moved by the same peg in the succeeding revolution, because the peg would be moved a line and an half beyond it by the lateral motion of the cylinder. Thus, by an artificial disposition of these pegs in different parts of the cylinder, the statue was made, by the successive elevation of the proper levers, to exhibit all the different motions of a flute-player, to the admiration of every one who saw it.

The construction of machines capable of imitating even the mechanical actions of the human body, shew exquisite skill; but what shall we say of one capable, not only of imitating actions of this kind, but of acting as external circumstances require, as though it were endowed with life and reason? This, nevertheless, has been done. One M. de Kempell, a gentleman of Presburg in Hungary, excited by the performances of M. de Vaucanson, at first endeavoured to imitate them, and at last far excelled them. This gentleman constructed an *Androïdes* capable of playing at chess!—Everyone, who is in the least acquainted with this game, must know, that it is so far from being mechanically performed, as to require a greater exertion of the judgment and rational faculties than is sufficient to accomplish many matters of greater importance. An attempt, therefore, to make a wooden chess-player, must appear as ridiculous as to make a wooden preacher, or counsellor of state. That this machine really was made, however, we have the attestation of the Rev^d Mr Dutens, whose account appeared in 1770, and is as follows. “This machine represents a man of the natural size, dressed like a Turk, sitting before a table which holds a chess-board. This table (which is about three feet and a half long, and about two feet and an half broad) is supported by four feet, that roll on castors, in order the more easily to change its situation, which the composer fails not to do from time to time, in order to take away all suspicion of any communication. Both the table and the figure are full of wheels, springs, and levers. M. de Kempell makes no difficulty of shewing the inside of the machine, especially when he finds any one suspects a boy to be concealed in it. I have examined with attention all the parts both of the table and figure, and I am well assured there is not the least ground for such an imputation. I have played a game at chess with the automaton myself. I have particularly remarked, with great astonishment, the pre-

cision with which it made the various and complicated movements of the arm with which it plays. It raises this arm; it advances it towards that part of the chess-board on which the piece stands which ought to be moved; and then, by a movement of the wrist, it brings the hand down upon the piece, opens the hand, closes it upon the piece in order to grasp it, lifts it up and places it upon the square it is to be removed to. This done, it lays its arm down upon a cushion, which stands beside the chess-board. If it ought to take one of its adversary's pieces, then, by one entire movement, it removes that piece quite off the chess-board, and, by a series of such movements as I have been describing, it returns to take up its own piece, and place it in the square which the other had left vacant. I attempted to practise a small deception, by giving the queen the move of a knight: but my mechanic opponent was not to be so imposed on; he took up my queen, and replaced her in the square she had been removed from. All this is done with the same readiness that a common player shews at this game: and I have often engaged with persons who played neither so expeditiously nor so skillfully as this automaton, who yet would have been extremely affronted if one had compared them to him.”

Tho' this account is written in such a manner that its authenticity can hardly be questioned, the fact appears so much beyond the verge of credibility, that, without some corroborating evidence, we could scarce have allowed ourselves to believe it; but having been favoured with the following extract of a letter to Sir W^m Forbes of Edin^r, dated Paris, May 22^d 1777, concerning this machine, we must now look upon its existence as indisputable. “I shall give you what particulars I recollect with regard to my surprising friend.—I was then in company with several English gentlemen: we were introduced to the automaton's chamber: The machine was a well-dressed Turkish figure as large as life, seated at a square table, or rather box (as it was close on all sides), surrounded at a little distance by a rail, within which no person entered but the proprietor (an independent gentleman of Presburg.) The chess-board seemed fixed to the table, which was so placed, that any person from without the rail could play on it. Before the game began, the proprietor opened the sides of the table, and the body of the Turk; but nothing was to be seen but wheels upon wheels. He then wound up the machine (this he repeated once during the game.) A gentleman of our company was his antagonist; and as he was but a wooden Turk, he gave him the first move. I do not understand the game; but those present who did, said he played very well. The game was left unfinished, as all there were fully satisfied that this wooden Turk did play the game; but no one dared hazard a guess on what principle, or who directed. His right hand, with which he made all his moves, had the fingers as it were drawn together, which he opened and closed at pleasure when he removed any of his men. His face had a serious cast; which, added to a grave shake of the head when any difficulty arose in the game, had a most ridiculous effect: on the contrary, when his adversary laid himself open, his motions were quicker; and when he made a false stroke (which he did on purpose), he immediately removed the man off the board with which the stroke was made. I forgot to mention, that within the rail, at the distance of some feet from the machine, there stood

Androlepsy a small square box on a stool, which apparently had no connection with the machine, but which the proprietor said he must have opened had it gone wrong. I imagined I heard a noise in the box like that occasioned by the turning of wheels.—His arm moved horizontally, at a height so as not to discompose the men. When his hand came over the man he wanted to move, he opened his fingers, let it down, closed them on the man, lifted him up and carried him off the board, let him down, and laid his arm down upon the table.”—

As the inventor of this admirable piece of mechanism hath not yet thought proper to communicate to the public the means by which it is actuated, it is in vain for any, except those who are exquisitely skilled in mechanics, to form conjectures concerning them.—Many other curious imitations of the human body, as well as that of other animals, have been exhibited, though none of them equal to the last mentioned one. See the article **AUTOMATON**.

ANDROLEPSY, in Grecian antiquity, an action allowed by the Athenians against such as protected persons guilty of murder. The relations of the deceased were empowered to seize three men in the city or house whither the malefactor had fled, till he were either surrendered, or satisfaction made some way or other for the murder.

ANDROMACHE, the wife of the valiant Hector, the mother of Astyanax, and daughter of Eton king of Thebes in Cilicia. After the death of Hector and the destruction of Troy, she married Pyrrhus; and afterwards Helenus the son of Priam, with whom she reigned over part of Epirus.

ANDROMACHUS'S TREACLE. See **PHARMACY**, n° 893.

ANDROMEDA, in astronomy, a northern constellation, named Pegasus, Cassiopeia, and Perseus. It represents the figure of a woman chained; and is fabled to have been formed in memory of Andromeda, daughter of Cepheus and Cassiopeia, and wife of Perseus, by whom she had been delivered from a sea-monster, to which she had been exposed to be devoured for her mother's pride. Minerva translated her into the heavens.

The stars in the constellation Andromeda in Ptolemy's catalogue are 23, in Tycho's 22, in Bayer's 27, in Mr Flamsted's no less than 84.

ANDROMEDA, the name of a celebrated tragedy of Euripides, admired by the ancients above all the other compositions of that poet, but now lost.

It was the representation of this play, in a hot summer day, that occasioned that epidemic fever, or phrenzy, for which the Abernethies are often mentioned, wherein they walked about the streets, rehearsing verses, and acting parts of this piece. See **ABDERA**.

ANDROMEDA, a genus of the monogynia order, belonging to the decandria class of plants. For this genus there is no English name.

Species. 1. The polifolia is a low plant, growing naturally in bogs in the northern countries. It is difficultly preserved in gardens; and, being a plant of no great beauty, is seldom cultivated. 2. The mariana, a native of North America. It is a low shrub, sending out many woody stalks from the root, which are garnished with oval leaves placed alternately; the flowers are collected in small bunches, are of an herbaceous colour, and shaped like those of the strawberry-tree. They

appear in June and July. 3. The paniculata is a native of Virginia and Carolina, growing in moist places. The plants usually arrive at the height of ten feet, with thin leaves set alternately, and having their edges finely serrated. The flowers are tubulous, small, and of a greenish white, closely set horizontally on one side of the slender stalks. These flowers are succeeded by berries, which open when ripe; and divide into five sections, inclosing many small seeds. 5. The arborea is a native of the same countries, where it is called the *forrel-tree*. It grows to the height of 20 feet, with a trunk usually five or six inches thick. The branches are slender, thick set with leaves like those of the pear-tree. From the ends of the branches proceed many slender stalks, on one side of which hang many small white flowers like those of the strawberry-tree. 5. The caniculata, is a native of Siberia, and likewise of North America. It grows on mossy land, and is therefore very difficult to keep in gardens. The leaves are shaped like those of the box-tree, and are of the same consistence, having several small punctures on them. The flowers grow in short spikes from the extremity of the branches. They are produced single between two leaves, are of a white colour, and a cylindrical or pitcher-like shape.

Culture. All the sorts, except the fourth, are very hardy plants, which delight in moist ground. They increase by their creeping roots, which put up suckers at a distance. These may be taken off with roots; and transplanted where they are to remain, for they cannot bear to be often removed. The fourth sort requires to be sheltered from frost in winter, but in the summer should be frequently watered. It is difficult to keep in gardens, as it grows naturally in boggy places, and requires a greater heat than that of this climate. It may be propagated by seeds, which should be procured from America.

ANDRON, in Grecian antiquity, denotes the apartment in houses designed for the use of men; in which sense it stands opposed to *Gynæceum*.—The Greeks also gave their dining-rooms the title of *andron*, because the women had no admittance to feasts with the men.

ANDRONA, in ancient writers, denotes a street, or public place, where people met and conversed together. In some writers, *androna* is more expressly used for the space between two houses; in which sense, the Greeks also use the term *andronæus*, for the way or passage between two apartments.

ANDRONA is also used, in ecclesiastical writers, for that part in churches destined for the men. Anciently it was the custom for the men and women to have separate apartments in places of worship, where they performed their devotions asunder; which method is still religiously observed in the Greek church. The *andronæus*, or *androna*, was in the southern side of the church, and the women's apartment on the northern.

ANDRONICUS I. emperor of the East, caused Alexius II. who had been put under his care, to be strangled; and then took possession of the throne of Constantinople, in 1183; but the people, becoming exasperated at his cruelties, proclaimed Isaac Angelus emperor, and put Andronicus in irons: they then thrust out his eyes; and, having led him through the city in an ignominious manner, hanged him.

ANDRONICUS of Cyrrhus, built, at Athens, an octagon

Andronæus
Andronicus
+ Pl. XXII.
fig. 2.

Androphagi, *Andros*, tower, with figures carved on each side, representing the eight principal winds. A brais triton at the summit, with a rod in its hand, turned round by the wind, pointed to the quarter from whence it blew. From this model is derived the custom of placing weather-cocks on steeples.

ANDROPHAGI, in ancient geography, the name of a nation whose country, according to Herodotus, was adjacent to Scythia. Their name, compounded of two Greek words, signifies *man-eaters*. Herodotus does not inform us whether their manner of subsisting corresponded with their name; whether they were to be savage as to eat human flesh *. They are represented, however, as the most barbarous and fierce of all nations. They were not governed by laws: the care of their cattle was their chief employment. Their dress was like that of the Scythians; and they had a language peculiar to themselves.

ANDROS, one of the ancient Cyclades, lying between Tenedos and Eubœa; being one mile distant from the former, and ten from the latter. The ancients gave it various names, viz. *Cauros*, *Lafia*, *Nonagria*, *Epagris*, *Antandros*, and *Hydrulia*. The name of *Andros* it received from one *Andreus*, appointed, according to Diodorus Siculus, by Rhadamantus, one of the generals, to govern the Cyclades, after they had of their own accord submitted to him. As to the name of *Antandros*, the same author tells us, that *Afcianus* the son of *Æneas*, being taken prisoner by the Pelagians, gave them this island for his ransom, which on that account was called *Antandros*, or "delivered for one man." The name of *Hydrulia* it obtained in common with other places well supplied with water. It had formerly a city of great note, bearing the same name, and situated very advantageously on the brow of an hill, which commanded the whole coast. In this city, according to Strabo and Pliny, stood a famous temple dedicated to Bacchus. Near this temple, Mutianus, as quoted by Pliny, tells us, there was a spring called the *gift of Jupiter*; the water of which had the taste of wine in the month of January, during the feasts of Bacchus, which lasted seven days. The same author adds, that the waters, if carried to a place whence the temple could not be seen, lost their miraculous taste. Pausanias makes no mention of this spring; but says, that, during the feast of Bacchus, wine flowed, or was at least by the Andrians believed to flow, from the temple of that god. The priests, no doubt, found their account in keeping up this belief, by conveying, thro' secret conduits, a great quantity of wine into the temple.

The Andrians were the first of all the islanders who joined the Persians at the time Xerxes invaded Greece; and therefore Themistocles, after the victory at Salamis, resolved to attack the city of Andros, and oblige the inhabitants to pay large contributions for the maintenance of his fleet. Having landed his men on the island, he sent heralds to the magistrates, acquainting them, that the Athenians were coming against them with two powerful divinities, *persuasion and force*; and therefore they must part with their money by fair means or foul. The Andrians replied, that they likewise had two mighty deities who were very fond of their island, viz. *poverty and impossibility*; and therefore could give no money. Themistocles, not satisfied with

this answer, laid siege to the town; which he probably made himself master of and destroyed, as we are informed by Plutarch, that Pericles, a few years after, sent thither a colony of 250 Athenians. It was, however, soon retaken by the Persians; and, on the overthrow of that empire by Alexander the Great, submitted to him, along with the other islands. On his death, it sided with Antigonus, who was driven out by Ptolemy. The successors of the last mentioned prince held it to the times of the Romans, when Attalus, king of Pergamus, besieged the metropolis at the head of a Roman army; and, having taken it, was by them put in possession of the whole island. Upon the death of Attalus, the republic claimed this island, as well as his other dominions, in virtue of his last will. It is now subject to the Turks; and contains a town of the same name, with a great many villages. It is the most fruitful island in all the Archipelago, and yields a great quantity of silk. There are said to be about 6000 inhabitants, besides those of the villages Arni and Amoldeos, who are about two hundred, have a different language and customs, and are called *Albanos*. There are seven monasteries, a great number of churches, and a cathedral for the bishops of the Roman-catholic persuasion; but most of the inhabitants are of the Greek communion. The Jesuits had a house and a church in this island; but they were forced to quit them long ago. Here are some delightful valleys; but the air is bad, and the water of the city worse. The women would be agreeable enough, if it was not for their dress, which is very unbecoming; for they stuff out their clothes without the least regard to their shape: but the Albanese women make a much better appearance. The peasants make wicker-baskets, wherewith they supply the greatest part of the Archipelago. They have all sorts of game in the woods and mountains, but know not how to take them for want of guns. Their principal food is goats flesh; for there is no fish to be met with on their coasts. When they are sick, they are obliged to let the disease take its natural course, having neither physician nor surgeon on the island. A cad, assisted by a few of the principal persons of the island, has the management of civil affairs, and his residence is in the castle: an aga, who presides over the military force, lives in a tower without the city. About two miles from the present town are still to be seen the ruins of a strong wall with the fragments of many columns, chapters, bases, broken statues, and several inscriptions, some of which mention the senate and people of Andros, and the priests of Bacchus; from which it is probable, that this was the site of the ancient city. E. Long. 25. 30. N. Lat. 37. 50.

ANDROSACE, a genus of the monogynia order, belonging to the pentandria class of plants, for which there is no English name. Of this genus Dr Linnaeus reckons six

Species. 1. The maxima grows naturally in Austria and Bohemia, among the corn. It hath broad leaves, which spread near the ground; from the centre of these the footstalks arise, which are terminated by an umbel of white flowers like those of the auricula. These appear in April and May, and the seeds ripen in June; soon after which the plants perish. 2. The septentrionalis, villosa, carnea, and lactea, grow naturally on the Alps and Helvetian mountains, as also in Siberia. They

Andros,
Andros, &c.

Andrum
||
Anduxar.

are much smaller than the former, seldom growing more than three inches high. Of the other species, called the elongata, we have no particular description.

Culture. These plants are propagated by seeds, which should be sown soon after they are ripe, otherwise they seldom come up the same year. If permitted to scatter, they will grow better than when they are sown.

ANDRUM, a kind of hydrocele, to which the people of Malabar are very subject.—Its origin is derived from the vitious quality of the country waters, impregnate with corrosive muriatic salts, the source of most other diseases that infect the Malabarians. Its signs, or symptoms, are an erysipelas of the scrotum, returning every new moon, by which the lymphatics, being eroded, pour a ferous saline humour into the cavity of the scrotum. The andrum is incurable; those once seized with it, have it for life: but it is not dangerous, nor very troublesome, to those used to it; tho' sometimes it degenerates into an hydroaurocele. The means of prevention is by a heap of sand fetched from a river of the province Mangatti, and strowed in the wells. This is practised by the rich. As to the cure, they have only a palliative one; which is by incision, or tapping, and drawing off the water from the scrotum, once in a month or two.

ANDRYALA, DOWNY SOW-THISTLE; a genus of the polygamia æqualis order, belonging to the syngenesia class of plants.

Species. 1. The integrifolia is an annual plant, growing naturally in the south of France, Spain, and Italy. It rises to the height of a foot and an half, with woolly branching stalks. The flowers are produced in small clusters at the top of the stalks. They are yellow, and like those of the low-thistle; so do not make any great appearance. 2. The ragulina is a native of the Cape of Good Hope. The leaves are extremely white, and much indented on their edges. The flower-stalks grow about a foot high, having small clusters of yellow flowers, which appear in July. The seeds sometimes ripen in Britain, but not always. 3. The lanata is a native of Sicily and of the country round Montpellier. The lower leaves are indented and woolly, but those on the stalks are entire. It seldom rises more than a foot high, supporting a few yellow flowers at top. 4. The sinuata grows in Spain and Portugal: the leaves are broader, longer, and more downy, than either of the other forts; the flower-stalks rising more than a foot high. They branch into several foot-stalks, each sustaining one large yellow flower, shaped like those of hawk-weed, which are succeeded by oblong black seeds covered with down.

Culture. All these plants are easily propagated by seeds, which should be sown in autumn, where they are to remain, and will require no other culture than to thin them where they are too close, and to keep them free from weeds. The third sort must have a light dry soil, or it will not live in this country.

ANDUXAR, a city in the province of Andalusia, in Spain, seated on the Guadalquivir. It is pretty large, indifferently rich, and defended by a good castle. It is adorned with handsome churches and several religious houses, and inhabited by many families of high rank. The land about it abounds in corn, wine, oil, honey, and fruit of all sorts; and the inhabitants

carry on a considerable trade in silk. W. Long. 4. 2. N. Lat. 37. 45.

ANDUZE, a town of France in Lower Languedoc, seated on the river Gardon. It carries on a considerable trade in ferges and woollen cloth. E. Long. 3. 42. N. Lat. 43. 39.

ANEAU (Bartholomew), a native of Bourges in France, a man of eminent learning in the 16th century, educated under Melchior Volmar. He was professor at Lyons, where he propagated the doctrines of the Reformation secretly for a long time: but on the festival of the Holy Sacrament 1565, as the procession was passing on towards the college, there was a large stone thrown from one of the windows upon the Host and priest who carried it. The people, enraged at this, broke into the college, and assassinated Mr Aneau, whom they imagined to have been the occasion, and the college itself was shut up next day by order of the city.

ANECDOTE, among historians, implies some fact not formerly published to the world, or very little known. The word is Greek, ἀνέκδοτος; and compounded of ἀ, priv., and εκδοτο, published.

ANEE, in commerce, a measure for grain, used in some provinces of France. At Lyons, it signifies also a certain quantity of wine, which is the load an ass can carry at once: which is fixed at 80 English quarts, wine-measure.

ANEGADA, one of the Caribbee Islands in America. W. Long. 63. 5. N. Lat. 18. 6. It is only remarkable for its humming birds, and beautifully coloured crabs of a delicate taste.

ANELLO (Thomas). See MASSANIELLO.

ANEMOMETER, in mechanics, implies a machine for measuring the force and velocity of the wind.

Various machines of this kind have been invented at different times, and by different persons. The following has been often experienced, and found to answer the intention.

An open frame of wood, ABCDEFGHI, * is supported by the shaft or arbor I. In the two cross-pieces fig. 3. H K, LM, is moved a horizontal axis QM, by means of the four fails, *ah, cm, Of, gh*, exposed to the wind in a proper manner. Upon this axis is fixed a cone of wood, MNO; upon which, as the fails move round, a weight R, or S, is raised by a string round its superficies, proceeding from the smaller to the larger end NO. Upon this larger end or base of the cone, is fixed a rocket wheel, *k*, in whose teeth the click X falls, to prevent any retrograde motion from the depending weight.

The structure of this machine sufficiently shews that it may be accommodated to estimate the variable force of the wind; because the force of the weight will continually increase, as the string advances on the conical surface, by acting at a greater distance from the axis of motion; consequently, if such a weight be added on the smaller part, M, as will just keep the machine in equilibrio in the weakest wind, the weight to be raised, as the wind becomes stronger, will be increased in proportion, and the diameter of the cone NO may be so large in comparison to that of the smaller end at M, that the strongest wind shall but just raise the weight at the greater end.

If, for example, the diameter of the axis be to that of the base of the cone NO, as 1 to 28; then, if S

Anduze
||
Anemometer.

emone. be a weight of one pound at M on the axis, it will be equivalent to 28 pounds when raised to the greater end: if therefore, when the wind is weakest, it supports one pound on the axis, it must be 28 times as strong to raise the weight to the base of the cone. If therefore a line or scale of 28 equal parts be drawn on the side of the cone, the strength of the wind will be indicated by that number on which the string rests.

ANEMONE, WIND-FLOWER; a genus of the polygynia order, belonging to the polyandria class of plants. It has its name from the Greek word *ανημος*, signifying the wind; because the flower is supposed not to open unless the wind blows.

Of this genus Dr Linnæus enumerates 21 species; but those valuable on account of the beauty of their flowers are only the following. 1. The nemorosa, which grows wild in the woods in many parts of Britain, where it flowers in April and May. The flowers are white, purple, or reddish purple, sometimes single, and sometimes double, so that they make a pretty appearance. 2. The apennina is likewise a native of Britain, growing in woods. The flowers of this species, like the last, are sometimes single, and sometimes double; their colours are white, blue, or violet. They appear in April. 3. The coronaria. 4. The hortensia. These two are natives of the Levant, particularly of the Archipelago islands, where the borders of the fields are covered with them of the most beautiful colours. When they grow wild, the flowers are commonly single; but by culture they are greatly improved: they become large and double, making some of the greatest ornaments of gardens. Their principal colours are red, white, purple, and blue; some of them are finely variegated with red, white, purple, and many intermediate shades of these colours.

Culture. The first and second sorts may be propagated by taking up their roots when the leaves decay, and transplanting them in wildernesses, where they will thrive and increase greatly, if they are not disturbed. The two last sorts require a good deal of care, and ample directions for their culture.—The soil in which these flowers will thrive extremely, may be composed in the following manner: Take a quantity of fresh untrod earth (from a common or some other pasture land) that is of a light sandy loam or hazel mould, observing not to take it above ten inches deep below the surface; and if the turf be taken with it, the better, provided it hath time to rot thoroughly before it is used: mix this with a third part of rotten cow-dung, and lay it in a heap, keeping it turned over at least once a month for eight or ten months, the better to mix it, and rot the dung and turf, and to let it have the advantages of the free air. In doing this work, be careful to rake out all great stones, and break the clods; but by no means sift or screen the earth, which has been found very hurtful to many sorts of roots. This earth should be mixed twelve months before it is used, if possible: but if constrained to use it sooner, it must be the oftener turned over, to mellow and break the clods; observing to rake out all the parts of the green swaid that are not quite rotten, before it is used, as they would be prejudicial to the roots if suffered to remain. The beginning of September is a proper season to prepare the beds for planting, which (if in a wet soil) should be raised with this sort of earth six or eight inches above

the surface of the ground, laying at the bottom some of the rakings of the heap to drain off the moisture; but, in a dry soil, three inches above the surface will be sufficient: this compost should be laid at least two feet and a half thick, and in the bottom there should be about four or five inches of rotten neat's dung, or the rotten dung of an old melon or cucumber bed. The beds must be laid (if in a wet soil) a little round, to shoot off the water; but in a dry one, nearer to a level. In wet land, where the beds are raised above the surface, it will be proper to fill up the paths between them, in winter, either with rotten tan or dung, to prevent the frost from penetrating into the sides of the beds, which otherwise may destroy their roots. The earth should be laid in the beds at least a fortnight or three weeks before the roots are planted, and a longer time would be yet better, that it may settle; and when they are planted, stir the upper part of the soil about six inches deep, with a spade; then rake it even and smooth, and with a tick draw lines each way of the bed at six inches distance, so that the whole may be in squares, that the roots may be planted regularly: then with three fingers make a hole in the centre of each square, about three inches deep, laying therein a root with the eye uppermost; and when the bed is finished, with the head of a rake draw the earth smooth, so as to cover the crown of the roots about two inches thick.

The best season for planting these roots, if for forward flowers, is about the latter end of September, and for those of a middle season any time in October: but observe to perform this work, if possible, at or near the time of some gentle showers; for if planted when the ground is perfectly dry, and there should no rain fall for three weeks or a month after, the roots will be very apt to grow mouldy upon the crown; and if once they get this distemper, they seldom come to good after.

As all the fine varieties of these flowers were first obtained from seeds, so no good florist that hath garden-room should neglect to sow them; in order to which, he should provide himself with a quantity of good roots of the single (or what the gardeners call *poppy*) anemones, of the best colours, and such as have strong stems and large flowers, but especially such as have more leaves than common, and also other good properties: these should be planted early, that they may have strength to produce good seeds, which will be ripe in three weeks or a month's time after the flowers are past; when the seeds must be carefully gathered, otherwise they will be blown away in a short time, as being inclosed in a downy substance. You must preferre this seed till the beginning of August, when you may either sow it in pots, tubs, or a well-prepared bed of light earth: in the doing of it, you must be careful not to let your seeds be in heaps; to avoid which, the best method is to mix them with a little fine sand, and, when sown, gently streak the bed with a strong hair-brush.

In about two months after sowing, the plants will begin to appear, if the season has proved favourable. The first winter after their appearing above ground, they are subject to injuries from hard frosts, or too much wet, against both of which you must equally defend them: for the frost is very apt to loosen the earth, so that the young plants are often turned out of the ground, after which a small frost will destroy them; and too much wet often rots their tender roots, so that

Anemone.

Anemone,
Anemo-
scope.

all your former trouble may be lost in a short time for want of care in this particular: nor is any thing more destructive to those tender plants than the cold black frosts and winds of February and March, from which you must be careful to defend them, by placing a low reed-fence on the north and east sides of the bed, which may be moveable, and only fastened to a few stakes to support it for the present, and may be taken quite away as the seasons advance, or removed to the south and west sides of the bed, to screen it from the violence of the sun, which often impairs these plants when young. As the spring advances, if the weather should prove dry, you must gently refresh them with water, which will greatly strengthen your roots; and when the green leaves are decayed, if your roots are not too thick to remain in the same bed another year, you must clear off all the weeds and decayed leaves from the bed, and sift a little more of the same prepared good earth, about a quarter of an inch thick over the surface, and observe to keep them clear from weeds during the summer season, and at Michaelmas repeat the same earthing; but as these roots go left in the ground will come up early in the autumn, the beds should be carefully covered in frosty weather, otherwise their leaves will be injured, whereby the roots will be weakened, if not destroyed. If your roots succeed well, many of them will flower the second year, when you may select all such as you like, by marking them with a stick: but you should not destroy any of them till after the third year, when you have seen them blow strong, at which time you will be capable to judge of their goodness; for until the roots have acquired strength, the flowers will not shew themselves to advantage.

The fingle (or poppy) anemones will flower most part of the winter and spring, when the seasons are favourable, if they are planted in a warm situation, at which time they make a fine appearance; therefore deserve a place in every flower-garden, especially as they require little culture. There are some fine blue colours amongst these fingle anemones, which, with the scarlets and reds, make a beautiful mixture; and as these begin flowering in January or February, when the weather is cold, they will continue a long time in beauty, provided the frost is not too severe, or if they are covered with mats. The seeds of these are ripe by the middle or end of May; and must be gathered daily as they ripen, otherwise they will be soon blown away by the winds.

ANEMOSCOPE, a machine that shews either the course or velocity of the wind *.

* See also
the article
Wind-
GAUGE.

The machine which shews the course of the wind, or from what point of the compass it blows, consists of an index moving about an upright circular plate, like the dial of a clock, on which the 32 points of the compass are drawn instead of the hours. The index, which points to the divisions on the dial, is turned by a horizontal axis, having a trundle-head at its external extremity. This trundle-head is moved by a cog-wheel on a perpendicular axis; on the top of which a vane is fixed, that moves with the course of the wind, and puts the whole machine in motion. The whole contrivance is extremely simple; and nothing required in the construction, but that the number of cogs in the wheel, and rounds in the trundle head, be equal; because it is necessary, that, when the vane moves entire-

Anemo-
scope.

ly round, the index of the dial also make a complete revolution.—An anemoscope of this kind is placed in one of the turrets of the queen's palace. The anemoscope, calculated for indicating the force or velocity of the wind, is the same with what most writers call an *anemometer*; and we have accordingly described one of those machines under that article. We shall here add another, contrived by the late Mr Pickering, and published in the *Philosophical Transactions*, N^o 473. This anemoscope is a machine four feet and a quarter high, consisting of a broad and weighty pedicel, a pillar fastened into it, and an iron axis of about half an inch diameter fastened into the pillar. Upon this axis turns a wooden tube; at the top of which is placed a vane, of the same materials, 21 inches long, consisting of a quadrant, graduated, and shod with an iron rim, notched to each degree; and a counterpoise of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are fastened two small round pieces of wood, which serve as moveable radii to describe the degrees upon the quadrant, and as handles to a velum or sail, whose pane is one foot square, made of canvas, stretched upon four battens, and painted. On the upper batten, next to the shod rim of the quadrant, is a small spring which catches at every notch corresponding to each degree, as the wind shall, by pressing against the sail, raise it up; and prevents the falling back of the sail, upon lessening of the force of the wind. At the bottom of the wooden tube, is an iron index, which moves round a circular piece of wood fastened to the top of the pillar on the pedicel, on which are described the 32 points of the compass. The figure of this machine is given on Plate XXII. fig. 4. where *a* is the pedicel; *b*, the pillar on which the iron axis is fitted; *c*, the circle of wood, on which are described the 32 points of the compass; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoise of the vane. The adjoining figure represents the velum, which takes off: *a* is the plane of the velum; *b*, the spring; *c*, *c*, the wooden radii; *d*, *d*, the holes through which the pin in the centre of the quadrant goes. Its uses are the following.

1. Having a circular motion round the iron axis, and being furnished with a vane at top, and index at the bottom, when once you have fixed the artificial cardinal points, described on the round piece of wood on the pillar, to the same quarters of the heavens, it gives a faithful account of that quarter from which the wind blows. 2. By having a velum or sail elevated by the wind along the arch of the quadrant to an height proportionable to the power of the column of wind pressing against it, the relative force of the wind, and its comparative power, at any two times of examination, may be accurately taken. 3. By having a spring fitted to the notches of the iron with which the quadrant is shod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the highest blast, since the last time of examination, without the trouble of watching it.

The ingenious contriver of this machine tells us, that he carefully examined what dependence may be had upon it, during the storms of February 1743-4, and found that it answered exceeding well; for that, in such winds as the sailors call violent storms, the machine

Plate XXII.

Fig. 3.
ANEMOMETER

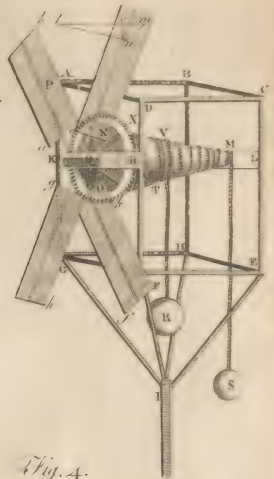


Fig. 5.
ANGUIS VENTRALIS
or Glass Snake

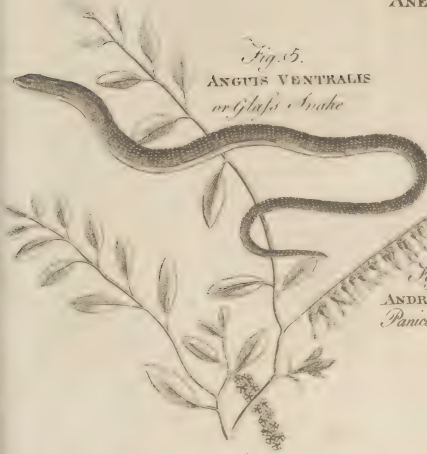


Fig. 2.
ANDROMEDA
Paniculata.

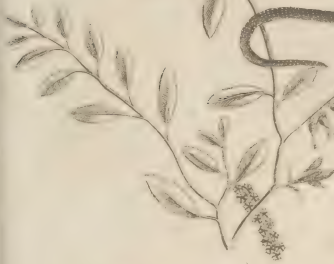


Fig. 4.
ANEMOSCOPE

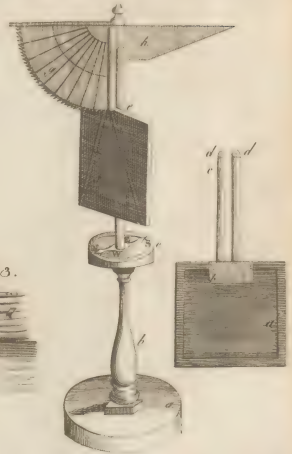


Fig. 1.
ANCHOR



N° 3.





Angiectomy,
Angel.

Angel.

stances entirely spiritual, though they can at any time assume bodies, and appear in human or other shapes.

That the angelical powers and abilities vastly excel those of man, cannot be denied, if we consider, that their faculties are not clogged or impeded, as ours are, by any of those imperfections which are inseparable from corporeal beings: so that their understandings are always in perfect vigour; their inclinations regular; their motions strong and quick; their actions irresistible by material bodies, whose natural qualities they can controul, or manage to their purposes, and occasion either blessings or calamities, public or private, here below, instances of which are too numerous to mention.

Besides their attendance on God, and their waiting and executing of his commands, they are also presumed to be employed in taking care of mankind and their concerns: and that every man had such a tutelar, or guardian angel, even from his birth, was a firm belief and tradition among the Jews; and our Saviour himself seems to have been of the same sentiment. The heathens were also of the same persuasion, and thought it a crime to neglect the admonitions of so divine a guide. Socrates publicly confessed himself to be under the direction of such an angel, or dæmon, as several others have since done. And on this tutelar genius of each person they believed his happiness and fortune depended. Every genius did his best for the interest of his client; and if a man came by the worst, it was a sign the strength of his genius was inferior to that of his opponent, that is, of an inferior order; and this was governed by chance. There were some genii, whose ascent was so great over others, that their very presence entirely disconcerted them; which was the case of that of Augustus in respect of that of Marc Anthony; and for the same reason, perhaps, some persons have wit, and speak well, when others are absent, in whose presence they are confounded, and out of countenance. The Romans thought the tutelar genii of those who attained the empire, to be of an eminent order; on which account they had great honours shewn them. Nations and cities also had their several genii. The ancient Persians so firmly believed the ministry of angels, and their superintendence over human affairs, that they gave their names to their months, and the days of their month; and assigned them distinct offices and provinces: and it is from them the Jews confess to have received the names of the months and angels which they brought with them when they returned from the Babylonish captivity. After which, we find, they also assigned charges to the angels, and in particular the patronage of empires and nations; Michael being the prince of the Jews, as Raphael is supposed to have been of the Persians.

The Mahometans have so great a respect for the angels, that they account a man an infidel who either denies their existence, or loves them not. They believe

them to be free from sin, enjoying the presence of God, to whom they are never disobedient: that they have subtil pure bodies, being created of light; and have no distinction of sexes, nor do they need the refreshment of food or sleep. They suppose them to have different forms and offices: that some adore God in several postures; others sing his praises, and intercede for men; some carry and encompass his throne; others write the actions of men, and are assigned guardians to them.

As the numbers of these celestial spirits are very great, it is likewise reasonable to believe that there are several orders and degrees among them; which is also confirmed by scripture: whence some speculative men have distributed them into nine orders, according to the different names by which they are there called; and reduced those orders into three *hierarchies*, as they call them; to the first of which belong seraphim, cherubim, and thrones; to the second, dominions, virtues, and powers; and to the third, principalities, arch-angels, and angels. They imagine farther, that there are some who constantly reside in heaven; others who are ministers, and sent forth, as there is occasion, to execute the orders they receive from God by the former. The Jews reckon but four orders or companies of angels, each headed by an arch-angel; the first order being that of Michael, the second of Gabriel, the third of Uriel, and the fourth of Raphael: but tho' the Jews believe them to be four, yet it seems there were rather seven. The Persians also held, there were subordinate degrees among the angels.

Although the angels were originally created perfect, Of the fall of angels. good, and obedient to their Master's will, yet some of them sinned, and kept not their first estate, but left their habitation, and so, of the most blessed and glorious, became the most vile and miserable of all God's creatures. They were expelled the regions of light, and cast down to hell, to be reserved in everlasting chains under darkness, until the day of judgment. With heaven they lost their heavenly disposition, which delighted once in doing good and praising God; and fell into a settled rancour against him, and malice against men: their inward peace was gone; all desire of doing good departed from them; and, instead thereof, revengeful thoughts and despair took possession of them, and created an eternal hell within them.

When, and for what offence, these apostate spirits fell from heaven, and plunged themselves into such an abyss of wickedness and wo, are questions very hard, if not impossible, to be determined by any clear evidence of scripture. As to the time, it is most reasonable to believe, that their fall preceded the creation of the world: though some have imagined it to have been after; and that carnality, or lust to converse with women upon earth, was the sin which ruined them: an opinion (a) built on a mistaken interpretation of scripture, as if angels were meant by the *sons of God* who are

(a) This opinion seems to have been originally occasioned by some copies of the Septuagint, which, in the days of St Austin, had in this place the *angels of God*. Lactantius supposes the angels, who were guilty of this enormity, had been sent down by God to guard and take care of mankind; and being endued with free-will, were charged by him not to forfeit the dignity of their celestial nature, by desisting themselves with the corruptions of the earth; but that the devil at length enticed them to debauch themselves with women. He adds, that, being not admitted into heaven by reason of the wickedness into which they had plunged themselves, they fell down to the earth, and became the devil's ministers; but that those who were begotten by them, being neither angels nor men, but of a middle nature, were not received into hell, no more than their parents were into heaven. Hence arose two kinds of dæmons, celestial

Angel.

are said to have begotten the mighty men of old on the daughters of men. Others have supposed, that the angels, being informed of God's intention to create man after his own image, and to dignify his nature by Christ's assuming of it, and thinking their glory to be eclipsed thereby, envied man's happiness, and so revolted: and with this opinion that of the Mahometans has some affinity, who are taught, that the devil, who was once one of those angels who are nearest to God's presence, and named *Azazel*, forfeited paradise for refusing to pay homage to Adam, at the command of God. But on what occasion soever it first shewed itself, pride seems to have been the leading sin of the angels; who, admiring and valuing themselves too much on the excellence of their nature and the height of their station, came at length to entertain so little respect for their Creator, as to be guilty of downright rebellion and apostasy.

It is certain from scripture, that these fallen angels

were in great numbers, and that there was also some order and subordination preferred among them; one especially being considered as their prince, and called by several names, *Beelzebub*, *Satan*, or *Sammaël* by the Jews; *Ahriman*, by the Persians; and *Eblis*, by the Mahometans. Their constant employment is not only doing evil themselves, but endeavouring by all arts and means to seduce and pervert mankind, by tempting them to all kind of sin, and thereby bringing them into the same deperate state with themselves.

ANGEL is likewise a title given to bishops of several churches. In this sense is St Paul understood by some authors, where he says, *Women ought to be covered in the church, because of the angels*. The learned Dr Prideaux observes, that the minister of the synagogue, who officiated in offering up the public prayers, being the mouth of the congregation, delegated by them as their representative, messenger, or angel, to speak to God in prayer for them, was therefore, in the He-

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celestial and terrestrial. These are unclean spirits, the authors of whatever evils are committed, and whose prince is the devil. From hence very probably proceeded the notions of *Incubi*, or demons who are supposed to have carnal knowledge of women.

But the fancy of angels desiling themselves with women has been greatly propagated by that forgery entitled *the prophecy of Enoch*. As the fragments of it are extant which give a particular history of these imaginary transactions, we shall here insert an extract of them for the amusement of our readers.

"When men were greatly increased, they had daughters of such excellent beauty, that the Egregori, or watching-angels, fell in love with them, and proposed to one another that they should go down and chuse themselves wives of the daughters of men: to which Semiazas, their prince, replying, that he was apprehensive they would not go through with the affair, but leave him to bear the guilt alone, they all swore and bound themselves under imprecations, that they would not recede from their resolution. The number of these Egregori was two hundred; who, in the days of Jared, descended on the top of mount Hermon, which was so called from the oath they had taken. Their princes were twenty, whose names follow: *Semiazas* their chief, *Atarcuph*, *Araciel*, *Chobabiel*, *Oranname*, *Raniel*, *Sampsieh*, *Zaciel*, *Balcie*, *Azalzel*, *Pharmarus*, *Anawiel*, *Anagenas*, *Thausiel*, *Saniel*, *Sarinas*, *Eumiel*, *Tyriel*, *Jumiel*, *Sariel*.

"These, and the rest of them, in the year of the world one thousand one hundred and seventy, took themselves wives, and began to commit lewdness with them, which they continued to do until the flood; and the women bore to them three generations. The first generation were the giants, the giants begat the Nephilim, and the Nephilim those named *Eliud*; and they were multiplied according to their stature, and taught themselves and their wives magic and enchantments. The tenth of their princes, named *Azalzel*, taught them to make swords, breastplates, and instruments of war; as also the working of metals, particularly gold and silver, and fashioning various ornaments for the women: he also instructed them in the preparing of cosmetics, the polishing of precious stones, and the art of dyeing. These things the sons of men provided for themselves and their daughters, and they transgressed; and also seduced those that were virtuous among them, and wickedness prevailed greatly in the earth. Semiazas, the chief of these angels, taught the force of poisonous roots and herbs; Pharmarus, the eleventh, charms and incantations; the ninth, astrology; the fourth, astrology; the eighth, aëroscopy; the third, the signs of the earth; the seventh, those of the sun; the twentieth, those of the moon; and in like manner each of them revealed certain secrets to their wives and children.

"Afterwards the giants began to devour human flesh; by which means the number of men daily decreasing, those that remained cried to heaven against their cruelty, and besought God to remember them. This the four arch-angels hearing, looked down upon the earth, and beholding a great deal of bloodthirst thereon, and that all manner of impiety and disorder was committed, made their report thereof to God, and at his command bound the princes of those transgressors, and threw them into the abyss, there to be kept to the day of judgment. Uriel in particular was sent to Noah, the son of Lamech, to acquaint him that the whole earth was to be destroyed by a deluge, and instructed him by what means to escape it. Raphael was ordered to bind Azazel [*Azalzel*] hand and foot, and to throw him into darkness, in the desert of Dudael, and to lay him upon sharp stones, and cover him with darkness, that he might dwell therein for ever, being destined to the punishment of fire on the day of judgment. The words which follow, directing him to heal the earth of the wounds caused therein, by the secrets revealed by the Egregori, are something dark, and deserve not the trouble of an explication. Gabriel's charge was to destroy the giants, the sons of the Egregori, by exciting them to mutual and intestine wars, that they might fall by each others hands; and Michael was commanded to bind Semiazas, and the rest of his companions, and to lead them, after they had seen the slaughter of their beloved sons, to the utmost parts of the earth, where they were to be confined for seventy generations, till the consummation of all things, and the day of judgment, when they were to be thrown into the gulph of fire. The giants, being begotten by a mixture of spirit and flesh, were condemned to become evil spirits, doing mischief upon the earth, appearing as spectres, and taking no food; but were to rise with mankind at the general resurrection. Therefore, from the day of the slaughter of the giants, the Nephilim, the mighty men of the earth, and the great men of renown, the spirits which went forth from their souls, as from flesh, were to continue their mischievous employments till the last day. It was also decreed, that mount Hermon, where those angels mutually bound themselves by an oath, should never be without snow and cold till the day of judgment, when it should melt like wax. Mankind are also threatened with a general destruction, and that their life should be but one hundred and twenty years."

Ex primo libro Enoch, apud Syncellum.

Angel.

† See the preceding note.

Angel,
Angelica.

brew language, called the *angel* of the church; and from thence the bishops of the seven churches of Asia are, by a name borrowed from the synagogue, called the *angels* of those churches.

ANGEL, in commerce, the name of a gold coin formerly current in England. It had its name from the figure of an angel represented upon it, weighed four pennyweights, and was twenty-three and a half carats fine. It had different values in different reigns; but is at present only an imaginary sum, or money of account, implying ten shillings.

ANGEL-FISH, in ichthyology, a species of squalus. See SQUALUS.

ANGELICA, a genus of the digynia order, belonging to the pentandria class of plants, of which there are five

Species. 1. The fativa, or common angelica, which is cultivated in gardens for medicinal use, and likewise for a sweetmeat, grows naturally in the northern countries. The root of this species is brown, oblong, and an inch or two thick, fragrant, and acrid. The leaves are very large, composed of pinnated foliola, of an oblong oval figure, dentated at the edge, and the odd leaf at the end of the pinna lobated; the stalk is round, striated, and as thick as a child's arm. The umbels are very large, and of a globose figure; the flowers very small, and greenish. 2. The arch-angelica is a native of Hungary and Germany. The leaves are much larger than those of the former, and the flowers are yellow. 3. The sylvestris grows naturally in moist meadows; and by the sides of rivers, in many parts of Britain; so is seldom admitted into gardens. 4. The atro-purpurea canadensis. 5. The lucida canadensis. These are natives of North America, but have neither beauty nor use.

Culture. The common angelica delights to grow in a moist soil: the seeds should be sown soon after they are ripe. When the plants come up about six inches high, they should be transplanted very wide, as their leaves spread greatly. If they are planted on the sides of ditches or pools of water, about three feet distance, they will thrive exceedingly.

Medicinal Uses. For the purposes of medicine, Bohemia and Spain produce the best kinds of angelica. The London college direct the roots brought from Spain to be alone made use of. Angelica roots are apt to grow mouldy, and be preyed upon by insects, unless thoroughly dried, kept in a dry place, and frequently aired. We apprehend that the roots which are subject to this inconvenience might be preserved, by dipping them in boiling spirit, or exposing them to its steam, after they are dried.

All the parts of angelica, especially the root, have a fragrant aromatic smell, and a pleasant bitterish warm taste, glowing upon the lips and palate for a long time after they have been chewed. The flavour of the seeds and leaves is very perishable, particularly that of the latter, which, on being barely dried, lose the greatest part of their taste and smell: the roots are more tenacious of their flavour, though even these lose part of it upon keeping. The fresh root, wounded early in the spring, yields an odorous, yellow juice, which, slowly exsicated, proves an elegant gummy resin, very rich in the virtues of the angelica. On drying the root, this juice concretes into distinct molecule, which,

on cutting it longitudinally, appear distributed in little veins: in this state, they are extracted by pure spirit, but not by watery liquors.

Angelica is one of the most elegant aromatics of European growth, though little regarded in the present practice. The root, which is the most efficacious part, is rarely met with in prescription, and does not enter any official composition. See MATERIA MEDICA, n^o 104.

ANGELICS, in church-history, an ancient sect of heretics, supposed by some to have got this appellation from their excessive veneration of angels; and by others, from their maintaining that the world was created by angels.

ANGELICS is also the name of an order of knights, instituted in 1191, by Angelus Flavius Comnenus emperor of Constantinople.

ANGELICS is also a congregation of nuns, founded at Milan in 1534, by Louisa Torelli, countess of Guastalla. They observe the rule of St Augustine.

ANGELITES, in ecclesiastical history, a sect of Christian heretics, in the reign of the emperor Anastasius, and the pontificate of Symmachus, about the year 494; so called from Angelium, a place in the city of Alexandria, where they held their first meetings. They were called likewise *Severites*, from one Severus, who was the head of their sect; as also Theodosians, from one among them named *Theodosius*, whom they made pope at Alexandria. They held, that the persons of the Trinity are not the same; that none of them exists of himself, and of his own nature; but that there is a common god, or deity, existing in them all; and that each is God, by a participation of this deity.

ANGELO (Michael.) There were five celebrated Italian painters of this name, who flourished in the 16th and 17th centuries; but the two most distinguished of them are these. First, Michael Angelo Buonarroti, who was a most incomparable painter, sculptor, and architect, born in 1474, in the territory of Arezzi in Tuscany. He was the disciple of Dominico Ghirlandajo; and erected an academy of painting and sculpture in Florence, under the protection of Lorenzo di Medici; which, upon the troubles of that house, was obliged to remove to Bologna. About this time he made an image of Cupid, which he carried to Rome, broke off one of its arms, and buried the image in a place he knew would soon be dug up, keeping the arm by him. It was accordingly found, and sold to Cardinal St Gregory for an antique; until Michael, to their confusion and his own credit, discovered his artifice, and confirmed it by the deficient arm which he produced: it is rather unusual for the manufacturers of antiques to be so ingenuous. His reputation was so great at Rome, that he was employed by pope Sixtus to paint his chapel; and by the command of pope Paul III. executed his most celebrated piece, *The last judgment*. He has the character of being the greatest designer that ever lived; and it is universally allowed that no painter ever understood anatomy so well. He died immensely rich at Rome, in 1564. Secondly, Michael Angelo de Caravaggio, born at that village in Milan, in 1569. He was at first no more than a bricklayer's labourer: but he was so charmed with seeing some painters at work, that he immediately applied himself to the art; and made such a progress in a few years, that he was

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admired as the author of a new style in painting. It was observed of Michael Angelo Buonarroti, that he was incomparable in designing, but knew little of colouring; and of Caravaggio, that he had as good a goit in colouring, as he had a bad one in designing. There is one picture of his in the Dominican church at Antwerp, which Rubens used to call his master. It is said of this painter, that he was so strangely contentious, that the pencil was no sooner out of his hand, but his sword was in it. He died in 1609.

ANGELO (St.) a small but strong town of Italy, in the Capitanata. There are several other towns and castles of the same name in Italy, and particularly the castle of St Angelo at Rome. E. long. 15. 56. N. lat. 41. 43.

ANGELOS (los), a province of Mexico, the ancient republic of Tlascal, of which a city called *Tlascal* was once the capital. That city is now reduced to an inconsiderable village, and has given place to another called *Puebla de los Angeles*, or the city of Angels. It is situated in W. Long. 103. 12. and N. Lat. 19. 13. It was formerly an Indian town; but in 1530 was entirely abandoned by the natives, on account of the cruelties of the Spaniards. A succeeding viceroy of Mexico, by a milder treatment, recalled them; and the town is now exceedingly rich and populous, so as even to vie with Mexico itself in magnificence. It is situated on the river Zacatula, in a fine valley, about 25 leagues to the eastward of Mexico. In the middle is a beautiful and spacious square, from whence run the principal streets in direct lines, which are crossed by others at right Angles. One side is almost entirely occupied by the magnificent front of the cathedral; while the other three consists of piazzas, under which are the shops of tradesmen. The city is the see of a bishop, suffragan to the archbishop of Mexico, and we may form a judgment of the wealth of the place by the revenue of the cathedral and chapter, which amounts to 300,000 pieces of eight annually. It must be remembered, however, that in all popish countries the wealth of the laity by no means bears the same proportion to that of the clergy, as in Britain. What contributes greatly to increase the riches of this province is, that here is situated the city of Vera Cruz, the natural centre of all the American treasures belonging to Spain. See *VERA CRUZ*.

ANGELOT, a gold coin struck at Paris, while subject to the English; so called from the representation of an angel supporting the arms of England and France.

ANGER, a violent passion of the mind, consisting in a propensity to take vengeance on the author of some real or supposed injury done the offended party. See *MORAL PHILOSOPHY*, n° 31, 212.; and the article *EMOTIONS and Passions*, n° vi. and xi. 9, 10.

Physicians and naturalists afford instances of very extraordinary effects of this passion. Borrichius cured a woman of an inveterate tertian ague, which had baffled the art of physic, by putting the patient in a furious fit of anger. Valeriola made use of the same means, with like success, in a quartan ague. The same passion has been equally salutary to paralytic, gouty, and even dumb persons; to which last it has sometimes given the use of speech. Ettmuller gives divers instances of very singular cures wrought by anger; among others,

he mentions a person laid up in the gout, who, being provoked by his physician, flew upon him, and was cured. It is true, the remedy is somewhat dangerous in the application, when a patient does not know how to use it with moderation. We meet with several instances of princes to whom it has proved mortal; *e. gr.* Valentinian the first, Wenceslas, Matthis Corvinus king of Hungary, and others. There are also instances where-in it has produced the epilepsy, jaundice, cholera-morbus, diarrhœa, &c. *Mém. de Trev.* 1707. p. 923.

ANGERMANIA, a province of the kingdom of Sweden, bounded on the N. by Lapland and Bothnia, on the E. by the gulph of Bothnia and Medelpadia, and on the W. by Jemt and Herndel. It is full of rocks, mountains, and forests; and there is one very high mountain called *Scull*. It has excellent iron-works, and lakes abounding with fish.

ANGERMOND, a town of the duchy of Berg, in Germany, on the E. side of the Rhine, subject to the Elector Palatine. E. Long. 6. 20. N. Lat. 51. 10.

ANGERONA, in mythology, the name of a pagan deity whom the Romans prayed to for the cure of a distemper called the *quinzy*; in Latin, *angina*. Pliny calls her the *goddess of silence and calmness of mind*, who banishes all uneasiness and melancholy. She is represented with her mouth covered, to denote patience and refraining from complaints. Her statue was set up, and sacrificed to, in the temple of the goddess Volupta, to shew that a patient enduring of affliction leads to pleasure.

ANGERONALIA, feasts instituted at Rome in honour of the goddess Angerona. They were celebrated on the 21st of December.

ANGERS, a great city of France, and capital of the duchy of Anjou, with a bishop's see. It is seated a little above the place where the Sarte and the Loire lose themselves in the Maine. This last river divides the city into two equal parts. There are twelve parishes in the city, and four in the suburbs, which contain upwards of thirty-six thousand inhabitants. Besides these, there are eight chapters, and a great number of convents for both sexes. Its greatest extent is along the declivity of a hill, which reaches quite down to the river side. The castle is flanked with eighteen large round towers and a strong half-moon. From the platform there is a very delightful prospect. The cathedral church is remarkable for the length and height of its great nave, which is without pillars, and is thought to be the finest in France. It contains a treasure which is never shown but on great festival-days. Over the great gate are three very high steeples, the middlemost of which is supported by the other two, and seems to be suspended in the air: it is very much admired by strangers. At the foot of the castle there is a chain, which reaches to the other side of the river, and is fastened to a tower, which prevents the entrance by the river into the city. Near the church of St Michael is the handsomest square in the city, from whence runs a street which has the name of the church. On one side of this street is the town-house; which has a fine tower, with a clock, raised upon an arch, which serves for a passage into the great square. There are two large bridges, which keep up a communication between the two parts of the city; and in the lesser of these there is another square, which serves for a market.

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ket. The university of Angers was founded in 1398, and the academy of belles lettres in 1685. This last consists of thirty academicians. At the end of the suburbs of Bregigny are the quarries of Angiers, so famous for the fine slate which is got from thence. The pieces are of the thickness of a crown-piece, and a foot square. All the houses in Angers are covered with this slate, which has gained it the appellation of the *Black city*. W. Long. o. 30. N. Lat. 47. 28.

ANGHIERA, a town of Italy, in the duchy of Milan, and capital of a county of the same name. It is seated on the eastern side of the lake Maggiore, in E. Long. 9. 5. N. Lat. 45. 42.

ANGINA, in medicine, a violent inflammation of the throat, otherwise called *quinzy*. See *QUINZY*.

ANGIOSPERMIA, in the Linnæan system of botany, the second order in the class Didynamia. It consists of those plants, of that class, whose seeds are inclosed in a pericarpium. In this order the stigma is generally obtuse. These are the *personati* of Tournefort.

ANGLE, in geometry, the inclination of two lines meeting one another in a point, and called the *legs* of the angle. See *GEOMETRY*.

ANGLE of Incidence, in optics, the angle which a ray of light makes with a perpendicular to that point of the surface of any medium on which it falls; tho' it is sometimes understood of the angle which it makes with the surface itself.

ANGLE of Refraction now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the surface on which it was incident; but has sometimes been understood of the angle which it makes with the surface of the refracting medium itself.

ANGLER, a person who practices the art of angling, whether as a diversion, or otherwise. See the article ANGLING.

ANGLER, in ichthyology, the English name of a species of lophus. See *LOPHUS*.

ANGLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, settled in that part of Denmark, and duchy of Sleswick, which to this day is called *Angel*, and of which the city of Flensburgh is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variously accounted for. According to Saxo-Græmmaticus, they were called *Angli* from one Angulus, son to Humblus king of Denmark. Widschind, a Saxon writer, will have them to be called *Angli*, from an island in the corner or angle of the sea, which they conquered. Coropius derives their name from the Saxon word *Angel*, or *Engel*, signifying a fish-hook; the Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being so named by the neighbouring nations; as if, like hooks, they caught all that was in the sea. To this nation the British ambassadors are said to have applied when soliciting succours against the Scots and Picts. The Angles therefore came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England. See *ENGLAND*.

ANGLESEY (Ile of,) is the most western county of North Wales. It is 24 miles in length, 14 in

breadth, and sends one member to parliament. It is separated from Caernarvonshire by a strait called *Meni*, and on every other side is surrounded by the sea. It is a fertile spot, and abounds in corn, cattle, flesh, fish, and fowls; with very good mill-stones and grind-stones. The chief town is Beaumaris. Near Kermyn-harbour is a quarry of stone called *asbestos*, which is a beautiful marble, out of which may be got the linum asbestosum, called here *jalamander's wool*; and will bear common fire: not far from this is a yellow sulphureous copper-ore, which has never been worked. At Llabbadrig, about three miles eastward from hence, is a great body or vein of stony-oker, of various colours, as red, yellow, blue; and an extremely fine white-clay, of the cimolia kind, of great service to painters, potters, and stone-cutters. In ancient times this island was called *Mon*, *Mona*, or *Monag*; and got the name of *Anglesey* only when conquered by the English.

It was the great nursery of the religion of the Druids; being the residence of the grand Druid, or chief pontiff, and consequently of all the learned doctors in that religion. In the reign of the emperor Claudius (A. D. 45.) the Druids beginning to be persecuted by the Romans on account of their sacrificing human victims, most of them retired to this island: but they did not long enjoy their retreat in safety; for, in the year 61, Suetonius Paulinus governor of Britain, having observed that the island of Anglesey was a great seat of disaffection to the Roman government, and afforded an asylum to all who were forming plots against it, he determined to root them out. He accordingly entered the island, and defeated the Britons who attempted to defend it, though they were animated by the presence, prayers, and exhortations of a great number of Druids and Druidesses. After this victory, he cut down the groves, and overturned the altars, which had been polluted by the blood of many human victims; and even requited the cruelties of the Druids upon themselves, by burning many of them in the fires they had prepared for the Roman prisoners if the Britons had got the victory. Many ancient monuments of this religion still remain in the island.

ANGLING, among sportsmen, the art of fishing with a rod, to which are fitted a line, hook, and bait. See *FISHING-Rod*, *FISHING-Hook*, *FISHING-Fly*.

The angler's first business is to attract the fish to the place intended for angling. The method of doing this, in standing waters, by throwing in grains, chopped worms, and the like, is well known: but the chief difficulty is in running rivers and brooks. The method, in this case, is to prepare a tin box capable of holding some hundred of worms, bored on all sides, and full of holes of such a size as they may be just able to crawl out at; there must be a plummet fastened to this box to sink it, and a line to draw it back at pleasure; in this case it is to be thrown into the water in a proper place, above which the angler may stand under cover. The worms will slowly and gradually crawl out of this box, and the fish will be gathered about to feed on them; the baited hook is to be thrown in higher up and carried down by the stream. If this method do not bring the fish about the place in a little time, there is reason to suspect that some pike lies lurking thereabout, and deters them: in this case, it is proper to throw out a baited hook, and he will generally be taken:

Anglesey,

Angling.

Angling. taken; after this the attempt will succeed.

When the angler takes his stand, he is to shelter himself under some tree or bush, or stand so far from the brink of the water that he can only discern his float; as the fish are timorous and easily frightened away. The angling rod must be kept in a moderate state, neither too dry nor too moist: in the first case, it will be brittle; in the other, rotten. When pastes are used, it is proper to mix a little tow with them, and rub them over with honey; finally, a small anointing with butter is of great use to keep them from washing off the hook. The eyes of any fish that is taken are an excellent bait for almost any other kind of fish. The best way of angling with the fly is down the river, and not up; neither need the angler ever make above half a dozen of trials in one place, either with fly or ground bait, when he angles for trout: by that time the fish will either offer to take, or refuse the bait and not stir at all.

In a pond, the best place for the angler to take his stand is usually that where the cattle go up into water: in rivers, if breams are fished for, it should be in the deepest and most quiet places; if eels, under the banks of rivers that hang over; perch are to be expected in clean places, where the stream is swift; and chub in deep shaded holes: roach are mostly found where the perch are, and trout only in swift and clear streams. Places where there are many weeds, or old stumps of trees, harbour fish in great numbers, and they usually bite freely there; but there is danger of entangling the line, or fastening the hook to the weeds. In case of this accident, recourse is to be had to a ring of lead, of about six inches round, fastened to a small pack-thread: this ring is to be thrust over the rod, and let fall into the water. It will descend to the place where the hook is entangled; and then, by pulling the pack-thread gently, the hook will be soon disengaged, or at the worst it can only be broke off near the end of the line; whereas, when this is not employed, the rod itself is sometimes broken, or the line nearer its upper end.

Deep waters are best for angling in, for the fish do not love to be disturbed by wind and weather.

The openings of sluices and mill-dams always bring fish up the current to seek for the food, which is brought with the stream; and angling in these places is usually successful.

The best season is from April to October; for, in very cold stormy weather, the fish will not bite: the best times of the day are from three till nine in the morning, and from three in the afternoon till sun-set. In an easterly wind, there is never much sport for the angler; the southerly winds are the best for his purpose, and a warm (but lowering day is most of all to be chosen; a gentle wind, after a sudden shower, to disturb the water, makes a very good opportunity for the angler: the cooler the weather in the hottest months, the better; but in winter, on the contrary, the warmer the day the better. A cloudy day, after a bright moonlight night, is always a good day for sport; for the fish do not care for going after prey in the bright moonshine, and are therefore hungry the next morning.

Those who are fond of angling might save themselves some fruitless trouble, by observing when small fish in a jar take or refuse food. See FISH.

The several methods of angling for salmon, trout, carp, tench, perch, pike, dace, gudgeons, roach, flounder, &c. may be seen under the articles *Salmon-Fishing*, *Trout-Fishing*, &c.

ANGLO-CALVINISTS, a name given by some writers to the members of the church of England, as agreeing with the other Calvinists in most points except church-government.

ANGLO-SAXON, an appellation given to the language spoken by the English Saxons; in contradistinction from the true Saxon, as well as from the modern English.

ANGLUS (Thomas), an English priest, well known for the singularity of his opinions, and several little tracts which he wrote in the 17th century. He went by several names. Mr Baillet says his true name was *White*; but that he used to disguise it under that of *Candidus*, *Albius*, *Bianchi*, and *Richworth*; but he was most known in France by the name of *Thomas Anglus*. Des Cartes generally called him *Mr Vitur*. He passed some time in most countries of Europe; but his longest stay was at Rome and Paris. When he was in England, he lived a considerable time in the family of Sir Kenelm Digby; and seems to have had a great esteem for the opinions of this gentleman, as may be seen in his writings, particularly in the Preface to his Latin work concerning the Institutions of the Peripatetic Philosophy, according to the hypothesis of Sir Kenelm. He was a great advocate for the peripatetic philosophy. He attempted even to make the principles of Aristotle subversive to the explaining the most impenetrable mysteries of religion; and with this view, he engaged in the discussion of predestination, free-will, and grace. Mr Baillet says, "What he wrote upon this subject resembles the ancient oracles for obscurity." In such abstruse points as we have mentioned, he was much embarrassed; and, by giving too great scope to his own thoughts, he pleased neither the Molinists nor Janfenists. He is allowed, however, to have been a man of an extensive and penetrating genius. On the 10th of June, 1658, the congregation of the Index Expurgatorius at Rome condemned some treatises of Thomas Anglus. The doctors of Douay censured also 22 propositions extracted from his Sacred Institutions. He published his *Supplicatio postulativa iustitiae*, in opposition to their censure; wherein he complains that they had given him a vague undetermined censure, without taking any particular proposition. He died some time after the restoration of Charles II. but in what year is uncertain.

ANGOL, a city of Chili in South America, situated in W. Long. 78°. and S. Lat. 38°.

ANGOLA, a kingdom on the western coast of Africa, lying, according to the most probable accounts, between Lat. 8. 30. and 16. 21. South, forming a coast of upwards of 480 miles; but how far it extends from west to east, has never been exactly determined. Angola Proper is bounded on the north by the river Danda, which separates it from Congo; and on the south by the Coanza, by which it is separated from Benguela. This last, however, is now included in the kingdom of Angola, having been conquered by its monarchs, tho' it still retains the name of kingdom, and is included in the dimensions we have just now given. The air here is very hot and unwholesome, and the country mountainous;

Anglo-calvinists
Angola.

Angola.

tainous; there being but few plains to be met with in it, except on the sea-coast, and between the huge ridges of mountains.

Originally a province of Congo.

That part of the kingdom which we have distinguished by the name of *Angola Proper*, was subject to the kings of Congo in the year 1484, when the Portuguese first discovered the country: but how long it had been so before that time, is impossible to be discovered; as the inhabitants are utterly destitute of Chronology, and have no other way of distinguishing past events but by saying they happened in such a king's reign. Neither, though Angola became a distinct kingdom since its discovery by the Portuguese, is it known with more certainty at what time that revolution happened; or whether the Portuguese were not concerned in assisting the viceroy of the king of Congo, who governed the province of Angola, to set up for himself.

Tradition concerning its becoming a distinct kingdom.

All accounts agree, that this kingdom was founded by one *Ngola*, or *Angola*, from whom it took its name. According to the tradition of the country, this *Ngola* was a smith, and the inventor of that trade, in which he had been instructed by the demons of the country. In consequence of this, he became exceeding rich, not in gold, silver, or shell-money, which were not at that time in use; but in corn, cattle, and fruits, which were then exchanged in traffic. The country being not long after visited by a grievous famine, *Ngola* generously relieved his distressed countrymen, and saved the lives of some thousands. In gratitude for this generosity, they were unanimously chosen king; and hence the smith's trade is reckoned among the royal arts of Angola.

More authentic account.

According to other accounts which can be more depended upon, *Ngola* was the king of Congo's viceroy; who, having become powerful by the reduction of several of the neighbouring states, was induced to set up for himself. Dreading, nevertheless, the power of his old master, he chose to send him the usual tribute and presents annually, till he reckoned himself firmly seated on the throne, and had secured it to his descendants. His measures were greatly facilitated by the wars which the king of Congo was then engaged in with the *Giagas*, a barbarous and cannibal nation in the neighbourhood. These made such a powerful inroad into his dominions, that he was glad to ask assistance from *Ngola*; not as a subject, but as a friend and ally. This was readily granted; and the two monarchs continued ever after sending presents and assistance to each other, and encouraging a mutual commerce between their subjects.

Ngola the first king.

Ngola lived to a great age, highly respected by his subjects, and in alliance with the king of Congo and the Portuguese, whose numerous settlements on the coast had made them become very powerful. According to the custom of the country, he had many wives and concubines. By his chief favourite he had three daughters, *Zunda Riàngola*, *Tumba Riàngola*, and another whose name is unknown. Towards the latter part of his life, the king's chief care was to secure the crown to the eldest of these; for which purpose he consulted his beloved queen, who encouraged him in the design with all the eloquence in her power. By her advice, he sent for his lieutenant-general, a favourite slave, whom he had created viceroy over the whole kingdom, to acquaint him with his resolution. The artful minister did not fail to applaud his design, though his intention was to defraud the prince, and seize the

throne for himself. He accordingly took the opportunity, one day, when that prince and the whole court were employed in sowing their lands, to spread a report that the Angolic enemies had entered the kingdom, and were destroying every thing with fire and sword. In this confusion, the treacherous viceroy conducted the three princesses to the royal palace; and acquainting *Ngola* with the pretended danger, urged him to betake himself to a speedy flight. The frightened monarch, unable to stir with age, desired his minister to take the most proper means for his safety: whereupon, being a stout young fellow, he takes his majesty on his back, and carries him into a neighbouring wood; where he no sooner had him in a convenient place, than he stabbed him with a dagger. This stratagem was too shallow to remain long concealed; the murderer was quickly discovered, and many of the nobles rose in arms against him; but finding his party too strong to be opposed, they were at last obliged to submit, and suffer him quietly to ascend the throne, upon his publicly declaring that he had not seized it but with a view of securing it to the young princess *Zunda Riàngola*.

To this prince, the usurper palliated his conduct in the best manner he could; and she had art enough to disguise her resentment so effectually, that he never discovered, nor did she give him the smallest occasion for jealousy. At last, his sudden death gave *Zunda* an opportunity of ascending the throne peaceably; when she behaved with such moderation and justice, as to gain the love and affection of all her subjects. Her jealous temper prevented her from marrying; and, by giving too much way to it, she came at last to dread as rivals the two sons of her younger sister *Tumba*, and to form designs against their life. To accomplish her purposes, she ordered them to be brought to court, pretending to have them educated under her own eye. This was declined for some time; but at length the queen prevailed so far as to have the eldest sent to her; whom she no sooner got into her power, than she caused him to be massacred, with all his attendants; only one escaping, all covered with wounds, to carry the dreadful news to the prince and her husband.

On hearing of this bloody act, the afflicted parents immediately sallied forth at the head of all their vassals. They were waited for by Queen *Zunda* at the head of a numerous army; but, no sooner did her soldiers perceive the parents of the deceased prince, than they immediately abandoned the queen to their resentment. *Tumba* immediately rushed upon her sister, and stabbed her to the heart; after which, she commanded her entrails to be taken out, and thrown into the hole in which her son's body had been cast. Upon this *Tumba* was crowned queen of Angola, and invited her husband to participate with her in the management of public affairs. This offer he was too wise to accept; and *Tumba*, upon his refusal, resigned the crown into the hands of her surviving son, named *Angola Chilvagni*. He proved a great and wise prince, extending his dominions by conquest, and gaining the love of his subjects by the moderation and equity of his government. He was succeeded by one of his younger sons, named *Dambi Angola*; who no sooner ascended the throne, than he put all his brethren to death, lest they should unite in favour of the eldest. The rest of his reign proved conformable to such a beginning. He was a monster

Angola.

Murdered by his prime minister, who seized the throne.

Death of the usurper, who is succeeded by *Zunda Riàngola*.

Murders her nephew.

Is herself murdered by her sister.

Dambi Angola a cruel tyrant.

Angola.

Angola.

10
Ngola Chilivagni; his conquests.

14
The king's daughter falls in love with the Portuguese general.

11
Fancies himself a god.

15
Who retires to Congo.

16
Lays a plan for the conquest of Angola before the king of Portugal.

12
Revolt against Bandi Angola.

17
Defeats the Angolans.

13
Quelled by the assistance of the king of Congo and the Portuguese.

monster of cruelty, avarice, lewdness, and faithlessness: death, however, in a short time, happily delivered his subjects from this tyrant; who, notwithstanding his infamous life, was buried with the greatest magnificence; and a mount was erected over his grave, confiding, according to the custom of the country, of a prodigious number of human victims which had been sacrificed to his ghost. Dambi Angola was succeeded by Ngola Chilivagni, a warlike and cruel prince. He conquered many nations, and made the most dreadful inroads into the kingdom of Congo, along the rivers of Danda, Lucalla, Zanda, and Coanza; whose waters were often tinged with the blood of thousands whom he massacred in his excursions. Notwithstanding these horrid butcheries, Ngola Chilivagni shewed such generosity to those who readily submitted to him, that he was sure to conquer, not only wherever he came, but wherever he seemed to direct his forces. At last, as if weary of conquest, he planted a tree on the banks of the Coanza, about eight leagues from Loanda San Paulo, as a boundary to his ravages. This tree the Portuguese called *Isanda*, or *Isandaura*; and afterwards erected a fortress near it.

The same folly and insolence which took place in the breast of Alexander the Great, on account of his rapid conquests, soon puffed up the mind of this petty African tyrant. Because he had conquered and ravaged some of the neighbouring countries, and brought under his subjection a few cowardly barbarians; he first fancied himself invincible, and then that he was a god. He demanded the same respect and adoration that was paid to their other deities; and with this infamous demand his subjects were mean enough to comply. This pretended deity, however, was forced to submit to the fate of other mortals, and died without leaving a successor behind him.

On the decease of Ngola Chilivagni, the states elected Ngingha-Angola-Chilombo-Kickafanda, great-nephew to queen Tumba's husband, as his successor. He proved such a rapacious and cruel tyrant, that his subjects universally wished for his death; which, luckily for them, soon happened. He was interred with the usual pomp and solemnities, particularly that of having a whole hecatomb of human victims sacrificed upon his grave. His son Bandi Angola, who succeeded him, proved yet a greater tyrant than his father; so that he soon became intolerable to his subjects. A general revolt ensued, in which his subjects called in the cannibal Giagas to their assistance. These immediately poured in like a band of hungry dogs hastening to feed upon a carcase; and, having defeated and devoured the forces of the tyrant, besieged him in an inaccessible mountain; where, not being able to come at him, they resolved to reduce him by famine. Bandi Angola, being now reduced to the utmost distress, applied to the king of Congo for assistance. As it was the interest of that prince to hinder the ravenous Giagas from entering into the Angolic dominions, whence they could so easily pass into his own, he did not hesitate at granting his request; and ordered a strong reinforcement of the Portuguese, of whose valour he had a high opinion, and of whom he entertained a great number at his court, to march to the assistance of the king of Angola. The command of the army was given to one of the most experienced Portuguese officers; who, depending more

on the handful of Europeans under his command, than on the Congolese, attacked the rebels, tho' greatly superior in number; and, having utterly defeated them, restored the king of Angola to his throne.

This essential piece of service he endeared the Portuguese to Bandi Angola, that he took them into his service, and even into his council. Their general became a great favourite of the king, but much more so of his daughter, who conceived a violent passion for him. Unfortunately for them both, the amour was carried on with so little precaution on her part, that the king quickly discovered it; and immediately formed a resolution of exterminating the Portuguese all at once. Such violent measures, however, could not be concerted so privately but the princess got some intelligence of it; and having apprized her lover of his danger, he immediately withdrew into Congo, taking with him as many of his countrymen as he conveniently could. The king of Congo expressed such strong resentment against Bandi Angola for his ingratitude, that the Portuguese general would have probably prevailed upon him to declare war against Angola, had he not been obliged to defend his own dominions against a neighbouring prince who then made an invasion. This afforded that general a fair pretence of asking leave to return home; promising to return with such reinforcements as would enable the king of Congo to revenge himself for the affront put upon him by the Angolic monarch. His real intention, however, was, to give the king of Portugal a fair pretence for seizing upon the kingdom of Angola.

On his return to Lisbon, the Portuguese general having laid his plan before the king, it was so well relished by him, that an armament was ordered to be fitted out, well furnished with every necessary for building fortresses, &c. and a sufficient number of men. The wind proving favourable all the way back, the Portuguese soon arrived safe at Loanda San Paulo; whence the general dispatched a messenger to acquaint the king of Congo with his arrival, and to make him some rich presents. These were no sooner gone, than the admiral sailed up the Coanza; and, landing without opposition in the kingdom of Angola, set about erecting a fortress in a convenient situation, which was completed in a few days.

The king being informed of the return of the Portuguese, and of their fortifying themselves on advantageous ground, gathered together a numerous army; but his forces, though upwards of 100,000 in number, were utterly defeated by the Portuguese; vast numbers killed, and many more carried into slavery. The admiral now ravaged the whole country, putting all to fire and sword, and making himself master of every advantageous spot of ground. The king, however, had still the good luck to escape all the stratagems that were laid for him; and once more got safe to his inaccessible fortress.

All this time Bandi Angola had himself tyrannized, and allowed his favourites to tyrannize, in such a manner, that his subjects were become no less weary of his government than when they formerly revolted. Being now exasperated beyond measure at the calamitous war of which he had been the occasion, they formed a design of putting an end to his life; and in order to draw him out of his retreat, where he wallowed in all manner

Angola. of debaucheries, they had recourse to the following stratagem: A deputation was sent, acquainting him with the revolt of one Cuculo Cabazzo; who, at the head of a numerous band, committed the most cruel ravages. They besought his majesty either to levy a sufficient number of troops, and march in person against him, or to allow them to arm themselves against him. The credulous king complied with this last proposal; and granted them leave to raise what forces might be thought necessary. Four days after, notice was sent to the king, that his subjects had attacked the rebels, and had been repulsed with loss; but that, if his majesty would but condescend to animate them with his presence, the sight of him would inspire them with such courage, that they would assuredly prove victorious. This had the desired effect; and the king set out a few days after, without any other precaution than his own guards, to head his army, which was encamped on the banks of the Lucalla. He no sooner appeared in view, than all the chief officers came out to meet him; and, having, under pretence of paying their respects, gradually separated him from his guards, they fell upon him, and dispatched him at once.

18
Bandi An-
gola mur-
dered.

19
Cruelty of
the new
king.

Bandi Angola was succeeded by his son Ngola Bandi, whose mother had been a slave; and whose title to the crown was consequently disputable, according to the laws of the country. Of this the new king being well apprized, thought proper to begin his reign by putting to death every person who had opposed his election. He began with the *Tendula*, or commander of the king's rear-guard; who, by his office, is the chief of the electors, and the person who governs the kingdom during the interregnum. Him he ordered to be put to death, with all his family. These were followed by the principal officers of his father's court; all his concubines, together with their parents and near relations, whom he caused to be cruelly butchered; together with his half-brother, his father's son by a favourite concubine, and then but an infant. He did not spare even the son of his sister Zingha Bandi, whom he had by one of her paramours. The interest of his sister had contributed greatly to raise this tyrant to the throne; and his ingratitude, with the murder of her son, so exasperated her, that she swore to be revenged on him in the same way.

20
Makes war
on the Por-
tuguese and
is reduced to
great dis-
tress.

The Portuguese were the next objects of his resentment. These he so much dreaded on account of their valour and policy, that he immediately declared war, resolving not to lay down his arms till he had exterminated them to the last man, or driven them totally out of his dominions. His rashness, however, cost him dear. Myriads of the Angolic poltroons were overthrown by an handful of Portuguese; and the king himself forced to fly, first into the island of Chiconda in the river Coanza, and then into the deserts of Oaeco. Here his conquerors, out of great clemency, allowed him to live among the wild beasts, without any other sustenance than what the deserts afforded. He had the misfortune also to lose his queen and two sisters Cambi and Fungi, who were taken prisoners by the Portuguese, but treated very honourably.

The king being informed of the generous treatment of these three princeesses, sent an embassy to treat of their ransom, and an exchange of prisoners. This was readily agreed to; but all the misfortunes of the king

of Angola had not yet taught him wisdom. The princeesses were sent back, laden with presents; but the king refused to perform his part of the agreement, and thereby plunged himself into still greater difficulties. A new Portuguese viceroy being arrived about this time, Ngola was quite at a loss how to excuse the non-performance of his part of the treaty. At last, he had recourse to his exasperated sister Zingha; and having excused, as well as he could, the murder of her son, proposed to send her on a splendid embassy to the viceroy; and, as her embracing the religion of the Portuguese would intitle her more to their favour and confidence, he desired her to consent to it for the present. To this proposal Zingha consented; but without forgetting her repentment. She set out, as plenipotentiary for the king of Angola, with a magnificent retinue, was received with all the honour due to her rank, and lodged in a splendid palace prepared for her.

Angola.

21
His treach-

city.

22

Sends his sis-
ter Zingha
on an em-
bassy.

23

Her haugh-
ty behavi-
our.

At the first audience Zingha had of Don John (the Portuguese viceroy), she was greatly surprised to find a stately elbow-chair prepared for him to sit upon, and for herself only a rich tapestry spread on the floor, with a velvet cushion embroidered with gold, and placed over against the chair of state. Dissembling her displeasure, however, she beckoned to one of the ladies of her retinue, commanded her to lay herself down on her elbows and knees upon the carpet, and sat herself upon her back during the whole time of the audience. She behaved with such address and dignity, as to gain the admiration of the whole council. A proposal was made of entering into an alliance offensive and defensive with the king of Angola, provided he acknowledged himself the vassal of the king of Portugal, and submitted to pay a yearly tribute. To this Zingha replied, that such conditions were indeed fit to be imposed upon those who had been conquered by the sword; but not upon a great and powerful monarch, who only fought their friendship and alliance: upon which, the treaty was concluded on both sides, without any other conditions than the exchange of prisoners. The audience being over, Don John took notice to Zingha, as he conducted her out of the hall, that the lady who had served her as a seat, continued still in the same posture; upon which she replied, That it did not become the ambassadors of a great monarch to make use of the same chair twice, so he looked upon her as a piece of cast-off goods not worthy of further notice.

Zingha was so taken with the honours done her by the Portuguese, and so intent upon observing the order, dress, arms, &c. of their troops, that she staid at Loanda a considerable time, during which she was instructed in the Christian religion, and consented to be baptized in the year 1622, the 40th of her age. Don John and his spouse were her sponsors; who dismissed her soon after, with all possible honours, and highly satisfied with her reception and success. At her return, she took care to have the articles ratified by her brother; who expressed his approbation of them, and the highest obligations to her. He even went so far as to desire the Viceroy to send him some proper persons, to instruct him in the Christian religion, which he said he was very desirous of embracing. This request was immediately granted, and Don Denis de Faria, a negro priest, a native of Angola, was dispatched, along with an officer of distinction, to stand

24

Embraces
the Chris-
tian religion.

god-

Angola.

Angola.

godfather to the king. These met at first with a gracious reception: but when they came to talk of baptism, Ngola altered his tone, and told them it was too much below his dignity to receive it from the son of one of his slaves, and sent them both back. This was cried up by the courtiers as a princely act: but Zingha represented that it could not fail to exasperate the viceroy; and tried all possible means to dissuade him from it, but in vain. He suffered, however, his other two sisters, Cambi and Fungi, to be baptized; which was performed in 1625, with a splendor suited to their dignity.

25
War again
declared a-
gainst the
Portuguese.

As no experience seems to have been a sufficient antidote against the innate folly of Ngola Bandi, he soon after took it into his head to make war on the Portuguese, and invaded some of their territories. This last action proved his ruin: his troops were all cut off, and himself forced to swim for his life to a small island in the Coanza, about a mile long, and two bow-shoots in breadth; whither the Portuguese pursued and surrounded him, so that he had no other chance, but either to fall into their hands, or be devoured by the wild beasts with which the place swarmed. From both these dangers he was relieved by a dose of poison, given him, as was supposed, by his sister Zingha. Before this time, however, he had taken care to send his eldest son to the country of the Giagas, and put him under the care of one of their chiefs called Giaga Caza, whom he besought to take care of him and protect him from his aunt Zingha, as he rightly imagined she would not fail of attempting his life, in order to secure herself on the throne.

27
Zingha Ban-
di crowned
Queen.

Zingha Bandi was crowned queen of Angola, without opposition, in 1627.—She was a very artful woman, endowed with great preference of mind, firm in her resolutions, of an intrepid courage, and a great mistress in the art of dissimulation. She inherited a large share of her brother's jealous and cruel temper, to which she would not hesitate to sacrifice her nearest relations, if they gave her the least umbrage.—To this jealousy therefore she resolved to sacrifice her nephew, as well knowing he had a better title to the crown than herself. She made use of the most solemn oaths to draw him out of the hands of his guardian, protesting that she had accepted of the throne with no other view than to preserve it for him. But Giaga, being well acquainted with her temper, was proof against all her oaths and fair speeches.—Zingha, finding this method ineffectual, pretended a desire of resigning the crown to her nephew; to which she said she had no other objection, than that she was afraid he was yet incapable of assuming the reins of government. She therefore desired an interview with him, though ever so short, that she might satisfy herself in this particular, and promised to detain him no longer than Giaga should think necessary. Giaga thought there could be no danger in consenting to a short interview; and therefore sent the unfortunate prince to her, attended by a magnificent retinue. The cruel queen no sooner got him in her power, than she murdered him with her own hand, and caused his body to be thrown into the Coanza, ridding herself, by that inhuman act, of a dangerous rival, as well as revenging herself on her brother, as she had sworn to do, for the murder of her son.

Zingha's next scheme was to rid herself of the Por-

tuguese, who had established themselves in such a manner as to be almost entire masters of the country. They had built fortresses on every convenient spot that suited them, especially near her principal towns, which they could level with the ground with the greatest ease. They had engrossed all her commerce, were become very wealthy, and their numbers increased daily; so that they were dreaded not only by her subjects, but by all the neighbouring nations. As Zingha was of a martial temper, she did not long hesitate. She quickly made all necessary provisions, strengthened herself by alliances with the Giagas and other idolatrous nations, and even with the Dutch, and the king of Congo. With this combined force she attacked the Portuguese so suddenly and unexpectedly, that she gained some advantages over them, and the Dutch made themselves masters of San Paulo de Loanda, and soon after of some of the best provinces in the kingdom. This happened in the year 1641; and the Portuguese did not recover these places till the year 1648, when the Dutch were entirely driven out of Angola.

29
Declares
war against
the Por-
tuguese.

Zingha's successes proved still more short-lived. Her allies the Congoese were so completely overthrown, that they were forced to sue for peace; which the Portuguese did not grant till they had obtained a sufficient number of hostages, and obliged the Congoese to deliver up to them some considerable posts, upon which they immediately erected fortresses. Zingha's troops were now defeated in every battle; and these defeats followed one another so close, that she was soon abandoned, not only by her allies, but by her own troops. She was now constrained to abandon her dominions, and retire to some of the eastern deserts, whither the Portuguese did not think it worth while to follow her.

30
Her bad suc-
cess.

Zingha being reduced to such distress, the Portuguese, after giving her some time to ruminate on her situation, sent her proposals of peace, upon condition that she should become tributary to the crown of Portugal. This proposal she rejected with scorn; and let them know, that, however her dastardly subjects might submissively and shamefully behave towards them, their queen disdained subjection to any foreign power. On this haughty answer, the Portuguese, to mortify her still more, set up a king in her place. The person they pitched upon was named *Angola Oarji*, or *Aaru*, who was of the royal family. Before he was crowned, the Portuguese obliged him to turn Christian; and he was accordingly baptized by the name of John. The new king, however, soon died of grief, at seeing himself so hardly treated by his masters the Portuguese. They quickly set up another, named *Philip*, who bore the yoke with more patience, and lived to the year 1660.

31
Refuses to
become tri-
butary to
them.

In the mean time Zingha, exasperated almost to madness at seeing herself deprived of eleven of the best provinces in her dominions, and her authority in the remaining six greatly weakened, renounced the Christian religion, and embraced all the horrid and bloody customs of the Giagas, whom she outdid even in their own barbarity.—We have already hinted the barbarity of this nation in eating human flesh. In this Zingha not only joined them, but took pleasure in devouring the raw flesh of human victims, and drinking their blood while warm, both at her sacrifices and at her public meals.—She affected a martial and heroic spirit, to-

33
Zingha's a-
postasy and
horrid bar-
barity.

28
She mur-
ders her ne-
phew.

Angola.

gether with an utter aversion to the male sex; but, according to the Portuguese, maintained a number of the strongest and lustiest youths, in whose embraces she gave a full scope to her inclinations, and managed matters with such secrecy that her intrigues could never be discovered. At the same time she ordered many of her own sex to be ripped up, when their incontinency was manifested by their pregnancy; and their bodies, with those of the infants, to be cast to wild beasts.

But what made her most admired, as well as dreaded, by her subjects, was a notion that she had by various stratagems inculcated upon them, of her being able to penetrate into the most secret thoughts. To keep up this apprehension, she ordered the bones of her deceased brother to be brought from the island where he was poisoned, locked up in a chest covered with coarse plates of silver, and laid on a fine carpet upon a pedestal. A number of singhillos or priests were ordered to offer sacrifices to these bones, and to keep lamps continually burning before them. To this place she herself frequently repaired, to assist at those rites, which, as she gave out, and every body believed, engaged the spirit of the deceased to inform her of every thing that was done, said, or even designed, either in the kingdom or out of it.—To procure, however, as much real intelligence as possible, she kept vast numbers of spies all over the kingdom, who constantly gave her notice of what happened in their respective circles; and this she so cunningly improved to her own ends, that her subjects looked upon her as a kind of deity from whom nothing could be concealed.

34
Her influence over the Giagas.

By such means as these, Zingha gained such authority over the Giagas, that they were ready, at the very first indication of her will, to follow her through the most dreadful dangers, and to engage in the most desperate enterprises. She now made many strenuous and daring efforts to drive out the Portuguese; but though she had, in all probability, more valour and skill than her enemies, the fire-arms gave them such an advantage, that she was always defeated with great loss. Perceiving therefore the folly of attempts of this kind, she contented herself with making continual inroads into their country, carrying off or destroying every thing that fell in her way. Though she spared neither Europeans, nor blacks who were subjects of the mock-monarchs set up by the Portuguese, yet the case of the former was peculiarly dreadful when they happened to be taken prisoners. They were either roasted by a slow fire, or had their flesh cut off in pieces, and devoured before their faces, in the manner related by

35
Her terrible ravages.

* See Africa.

Mr Bruce of the Abyssinian oxen *. In this manner she infested the Portuguese territories for 28 years, scarce ever allowing them a moment's cessation of arms. Their mock kings were often obliged to shelter themselves from her fury in an inaccessible rock called *Macpongo*; and they themselves could never hope to enjoy their ill-gotten dominions with any kind of peace so long as this furious queen continued alive. They in vain exhausted all their politics either to reduce her by force, or to mollify her by presents and fair offers. The one she rejected with disdain, and always found means to baffle the other; nor would she hearken to any terms, unless they consented to resign all their conquests. The refusal of this demand was so commonly followed by some marks of her resentment, that

it was with the utmost difficulty the Portuguese could prevail on any body to carry their proposals to her; and as for Zingha, she disdain'd to make any to them, except those of the hostile kind. The terror of her arms procured her a free passage wherever she directed her course; all the inhabitants of a province making no less haste to abandon, than she to invade it. Thus she continued to advance, till at length she was got so far as the small island of Dangii in the river Coanza. The Portuguese now found themselves under a necessity of raising an army of negroes, in order to drive her out of it. Accordingly they surrounded the island, and intrenched themselves along the banks on both sides of the river; but while they were busy at their work, Zingha attacked them with such advantage, that she killed and wounded several hundreds of the blacks, and some of the white men. Elated with this advantage, she was preparing for another attack; when she perceived, to her surprise, that the Portuguese had drawn their lines so close, and raised them to such a height, that they overlooked her whole camp, and could fire upon her naked soldiers as if they shot at a mark.—Thus great numbers of her men were cut off, particularly her chief officers.—The queen, now perceiving the danger of her situation, amused the Portuguese with proposals of an accommodation; and having obtained a truce for three days, crossed the river in the dead of the night, and led her forces to the province of Oacco. The next morning the Portuguese, seeing no human creature upon the island, began to apprehend some new stratagem; but, upon landing some of their troops, they perceived themselves over-reached, and deprived of the fairest opportunity they ever had of forcing her to surrender at discretion.

Zingha laid no longer in the province whither she had retired, than till she was assured that the Portuguese were retired from the Coanza; and then, crossing that river once more, marched directly towards the kingdom of Metamba, which had been invaded by some of the neighbouring princes. The speed with which she led her forces thither, and recruited her army with multitudes of Giagas, who were all emulous of fighting under her banner, quickly enabled her to recover some of her territories in that kingdom. Beginning now to think herself successful, she again attacked the Portuguese; but was defeated with great loss, so as to be obliged to send for fresh troops. To complete her misfortune, she received news that the Giaga Casfangi had taken the advantage of her absence, to enter the kingdom of Metamba with a numerous army, had carried off the greatest part of the inhabitants, destroyed all the fruits of the earth, plundered the towns of all that was valuable, and set fire to the rest, leaving that kingdom in a manner desolate. To add to all this, her troops, exasperated at the loss of their wives, children, and goods, which were carried to the farthest corner of Benguela, were all on the point of revolting.

Notwithstanding this terrible and complicated disaster, Zingha behaved with such resolution and address, that the Portuguese, who, according to character, had probably infligated the Giaga against her, were so much afraid of her joining with him in alliance against them, that they dispatched one Anthony Coglio, a learned priest and an excellent negotiator, with

Angola.

36
Outwits the Portuguese.

37
Her complete military success.

38
The Portuguese send an embassy to her.

Don

Angola.

Don Gaspar Borgia an eminent officer, under pretence of negotiating a peace between them, first to the Giagas, and afterwards to the queen. They met with a very civil reception from the first, who told them that he was very willing to live at peace with that prince, and even to let her enjoy the kingdom of Metamba, though he was the rightful heir to it, provided she would lay down her arms. This answer encouraged the priest to try whether he could prevail on him to embrace the Christian religion; but this was declined by the Giaga in such strong terms, that the priest thought proper to desist, and set out for Zingha's camp.

39
their pro-
posals rejec-

Our ambassadors, at their first arrival, met with such a polite reception, as made them hope for success: but after she had heard their proposals, she assumed a haughty threatening tone; and told them, in the conclusion of her speech, "That it did not become her dignity to lay down her arms, till she had brought the war she had begun to an honourable conclusion: that as to the Giagas, whose sect she had embraced some years before, and who had furnished her with such a prodigious number of forces to fight in her defence, her honour and interest required that she should still keep them in her service, and under her protection: and lastly, that as to herself, she remembered, indeed, that she had formerly embraced Christianity; but that it was not now a proper season to propose her returning to it, and they ought to remember, that they themselves were the cause of her abandoning it."

Borgia, perceiving that she was not to be wrought upon by religious motives, shifted the topic; and told her, that she had gained honour enough in war, and that it was now high time to think of granting peace and tranquillity to the subjects of two such powerful kingdoms, and accept of the favour and friendship of the king of Portugal, which was offered her by his viceroy. To this the queen made answer, that she was perfectly well acquainted with the valour and strength of the Portuguese, and should esteem it an honour to be allied to that monarchy; but that she thought it just that their respective claims to the dominions which she justly inherited from her ancestors, and of which he had unjustly deprived her, should first of all be decided, either by the sword, or by some equitable judges.

Borgia, vainly imagining that he had now obtained enough, set off immediately for Loanda San Paulo; but left the priest, on some pretence or other, to see whether, in the time of sickness, he could make any impression on the inflexible mind of Zingha, who now laboured under a lingering disease. Coglio, however, found all his arts to no purpose; and, upon the queen's recovery, she recommenced the war with more fury than ever.

40
ngha's
rrow e-
pe.

For some time, hostilities were carried on with various success; Zingha being sometimes victorious, and sometimes defeated. In one attempt of the latter kind, before the fortress of Massangana, the not only lost a great number of men, but had her two sisters Cambi and Fungi taken prisoners, she herself escaping with the utmost difficulty. Exasperated by this loss, she led her troops into some of the best provinces of the Portuguese; and, abandoning them to the fury of the Giagas, reduced them to a mere wilderness. Still, however, she had the mortification to find her losses vastly greater than what she gained; and had now the additional mis-

fortunes of losing her sister Fungi, who was put to death by the Portuguese for treachery; and seeing her allies the Dutch totally expelled out of Angola.

Angola

Zingha being thus oppressed with a complication of misfortunes, and conscious of the crimes she had committed, began seriously to consider whether such a continued series of disasters was not owing to the displeasure of the God of the Christians. To this opinion she seemed to have inclined; and therefore began to treat with more lenity such Christians as fell into her hands, especially if they happened to be priests or monks. To these she now began to listen with some attention; and ordered them, under severe penalties, to be treated with all possible respect; yet without losing in the least that invincible hatred he had conceived against those who had stripped her of her dominions, or dropping her resolution never to make peace till she had recovered them.

The viceroy, Don Salvador Correa, who had driven out the Dutch, being apprised of the regard shewn to the clergy by Queen Zingha, thought proper to send some capuchins to her, in hopes that they might now find her more tractable. But Zingha was still proof against their utmost art; and, when they taxed her with her apostasy, gave them the answer which such hypocrites deserved, namely, that she had been driven to it by the injustice of the Portuguese, themselves; and that if they would consent to restore what they had unjustly taken from her, she would not only return to the Christian religion, but encourage it to the utmost of her power.

42
But still re-
fills the arti-
fices of the
Portuguese.

The viceroy, being now afraid that Zingha might make an alliance against him with the king of Congo, first raised a powerful army; and then acquainted that monarch, that, if he designed to prevent the total ruin of his dominions, he must immediately make reparation for all the damage he had caused to the Portuguese by his alliance with the Dutch. The fame of the Portuguese valour so intimidated the king, that he submitted to a treaty almost on the viceroy's own terms; and as soon as this treaty was concluded, Don Ruy Pegado, an old experienced officer, was dispatched to Zingha, offering a firm and lasting alliance with her, provided she renounced the Giagan sect, and returned to the bosom of the church. To this embassy she returned the old answer, namely, that the Portuguese themselves had been the occasion of all that had happened; as they had not only stripped her of her hereditary dominions, but dared to proclaim one of her vassals king of Angola; but, provided these dominions were restored, she would immediately embrace Christianity.

All this time the furious Queen Zingha went on with her ravages, notwithstanding the viceroy kept plying her with letters for near three years. At last he had recourse to the execrable artifice of taking advantage of the remorse for her crimes with which Zingha was sometimes affected, in order to procure the peaceable enjoyment of his own ill-gotten conquests.

43
Their info-
mous con-
duct.

It is easy to see, that had this viceroy, or the priests he employed, really intended to convert Zingha to Christianity, they ought to have so far set her an example as at least to abandon part of the countries of which they had robbed her. But, instead of this, they impudently made use of the sacred name of our Saviour in order to deter a poor savage African from recovering what justly belonged to her: A piece of conduct which it is

doubtful

Angola.

doubtful whether it was more antichristian, or mean in itself; especially if we consider that their antagonist was a woman, who fought against them under every possible disadvantage; and, by having recourse to this stratagem, in its effect confessed her to be invincible.

44 Her stratagems to prevent a revolt of her subjects.

Queen Zingha, at last, came to incline so much to return to the Christian religion, that a general murmur ran through her army; to quiet which, she had recourse to many stratagems, too tedious here to enumerate particularly. The principal one was, to cause the singhillos or priests command her, in the presence of four of her officers, to return to Christianity; and thus, as if they had received it as a revelation from the spirit of her deceased brother, who, according to their account, was damned to eternity. Five of the singhillos having acted a farce of this kind, the queen asked the officers who were present, their opinion of what they had heard and seen, and their advice how she ought to act. To this they replied, "that the matter depended wholly upon her will; that, let her act in it as she pleased, she would always find her subjects ready to approve of and conform to it, and think it most for their honour and advantage to follow her example."

When the thought, by artifices of this kind, that the minds of her subjects were sufficiently prepared for hearing her sentiments openly, Zingha drew up her army (in 1655), and putting herself at their head, with a majestic, yet seemingly joyful aspect, she let fly an arrow, with her usual strength and vigour, and then turning to them, "Who is there (says she) that is strong enough to stand against my arms, or to resist the force of this arm?" On this, they all fell a-clapping their hands, and cried out three times successively, "O glorious and mighty queen, none, none, none, will ever be able to conquer you."—Encouraged by their acclamations, Zingha now made a speech, in which she acquainted them with her renouncing the sect of the Giagas, and of her return to Christianity; giving at the same time liberty to those who chose to abandon her on this account to go where they would; and such was their attachment to her, that even in such a sudden and important change in her resolutions they expressed no uneasiness, but on the contrary applauded her to the highest degree.

The Portuguese, after having been harassed in a terrible manner for 28 years, and at last obliged basely to profane the name of their Saviour to procure a peace, began now freely to enjoy the rewards of their villany. A treaty was unanimously set on foot between the viceroy and Zingha; which, however, was not easily concluded. She demanded the release of her sister Cambi, whose Christian name was Donna Barbara; and the Portuguese demanded a ransom of 200 slaves, or an equivalent in money. This Zingha did not well relish; and, being pressed to compliance, threatened them with a more furious war than any they had yet experienced. Upon this the viceroy was obliged to have recourse to the usual method of sending priests to persuade her to comply through motives of religion. These detestable hypocrites effected their purpose, and the slaves were sent, as if Christianity required the delivering up innocent people to those who had no lawful authority over them: but not being able to conclude a lasting peace about the cession of the Angolic provinces, they were forced to conclude a short truce, and send back her

filter.

This princess was received by Zingha in a very affectionate manner; and, some time after, the queen, her mind being probably weakened through the infirmities of old age, not only was thoroughly reconciled to the Portuguese, but looked upon them as her best friends. She encouraged the Christian religion; had a church built in her capital; made several laws against Paganism; and, to encourage marriage, she herself wedded a handsome young fellow in the 75th year of her age.

The Portuguese now imagining they would at last gain their point, proposed to her the following terms, as the basis of a lasting treaty between the two nations.

1. "That they should yield to her, as a present, some of the countries of which they had already robbed her.

2. "That, in consideration of the said present, which should in no ways be interpreted as an investiture, the queen should pay yearly a certain acknowledgment to the king of Portugal, who should be at liberty to withdraw the said present whenever he failed of making the said acknowledgment.

3. "That a free commerce should be opened between those two states, as well for slaves, as for other merchandizes.

4. "That the queen should molest none of the lords that were feudatory to the Portuguese, whatever damages and ravages they might have committed during the late wars between them.

5. "That she should restore all the Portuguese slaves that had taken refuge in her dominions.

6. "That she should deliver up the Giaga Colanda, who had revolted from the Portuguese, upon condition that his crime should go unpunished."

The queen, having now a thorough view of the deep-rooted villany of those with whom she had to do, conceived such displeasure against the Portuguese, that she fell sick. During this sickness, father Anthony, her chief confidant, and a creature of the viceroy, never left off soliciting her to make her peace with God, and to accept of the terms offered her by the Portuguese: but Zingha, though worn out with age and sickness, had still the good sense to perceive, that there was no connection between making her peace with God, and complying with such infamous terms; and therefore gave the following answer, which, under such circumstances, shews a magnanimity scarce equalled in any age or in any country.

1. "That as to her conversion, as it was neither owing to any desire of obtaining a peace, or other worldly motives, but the Divine Grace by which she was recalled, she was resolved to persevere in it to her last breath.

2. "That, as to her going over to the Giagan sect, she had in a great measure been forced to it by the Portuguese viceroy.

3. "That the king of Portugal would do a generous act in restoring some of her Angolic dominions; but it would be more so, were he to restore them all.

4. "That as to her paying homage to him, neither her mind nor heart were base enough to consent to it; and that as she had refused the proposal while she lived among the Giagas, much more did she think herself above it, now she was a Christian queen, and owed neither tribute nor homage to any but to the Supreme Power, from

Angola.

47 The Portuguese term

45 She renounces the Giagan sect and returns to Christianity

46 Treaty with the Portuguese proposed.

48 The Queen noble answer.

Angola. from whom she had received both her being and her kingdom: That, nevertheless, if she could be convinced that there was any thing in her dominions that would be acceptable to his Portuguese majesty, she would voluntarily make him a present of it; and as to the rest of the articles, such was her desire of making a firm and lasting peace with them, that she should make no difficulty of consenting to them."

This answer was not altogether satisfactory to the viceroy; but the priest, finding it impossible to make any impression upon her mind, easily prevailed upon him to consent to the following terms.

49
icles of
treaty.

1. "That the river Lucalla should be the boundary between the dominions of the Portuguese and of Queen Zingha.

2. "That neither side should thenceforth give any reception to the fugitive slaves of the other, but send them back without any delay, together with the prisoners which had been taken during the last war.

3. "That the queen should remain wholly free and exempt from all tribute and homage whatever, provided she agreed to the other articles."

50
peace
cd.

These terms were at last signed by the queen and viceroy in the month of April 1657, and ratified by the king of Portugal in the month of November the same year.—The only difficulty the queen had concerning this treaty was with regard to the Giaga Colanda; and the manner in which she extricated herself from it, with her subsequent behaviour, cannot fail to give us an high idea of the mental abilities of our heroine.

51
gha's ho-
rrible be-
lour.

This Giagan chief, weary of the Portuguese yoke, had retired from them, at the head of 1000 stout soldiers, and a much greater number of slaves, some leagues beyond the river Lucalla, and put himself under the queen's protection. This she readily granted, as he was very able to be serviceable to her in case the perfidious conduct of the Portuguese should oblige her to renew the war. She could not therefore but look upon it as unjust and dishonourable, to deliver up a brave chief who had devoted himself to her service, and whom she had taken under her special protection, to a nation whose perfidy she was so well acquainted with. To save her honour, therefore, some time before the ratification of the treaty, she sent privately for the Giaga, and acquainted him with the demand of the Portuguese; telling him, at the same time, that though she doubted not of the viceroy's keeping his word, and forgiving his offence, yet she advised him to go out of her dominions, and settle himself and his men in some distant country from the Portuguese frontiers; but forbade him, on pain of her highest displeasure, to commit the least outrage or hostility within their dominions.

52
ests and
in the Gi-
Colanda

The Giaga thanked her majesty, and seemed to acquiesce with her advice, but did not follow it. On the contrary, he had no sooner reached his fortrefs, than he set himself about fortifying it in such a manner as looked rather like defiance than defence; and, having gathered a considerable army, soon spread a general terror around him. Of this the Portuguese failed not to complain to the queen; who immediately marched against him, surprised and defeated his army; and he himself being killed in the action, his head was cut off and sent to the Portuguese.

This was among the last memorable actions perform-

ed by this famous queen; who, now finding herself unfit for the fatigues of war, contented herself (in 1658), with dispatching an old experienced general against a neighbouring prince who had invaded her territories. He proved no less successful than herself, and quickly forced the aggressor to submit to her terms. She now gave herself up to study the best method of propagating Christianity among her subjects; and for this purpose sent a solemn embassy to Rome, to pay homage to the Pope in her name, and to request a fresh supply of missionaries. To this letter she received an answer from his Holiness in 1662; and it was read in the church, that same year, in the most public and solemn manner. The day appointed was the 15th of July; on which she repaired to the church at the head of a numerous retinue, and having the letter hanging about her neck in a purse made of cloth of gold. The concourse was so great, that the church could not contain one half of the people, so that none were admitted but persons of rank.

The father having finished the mass, read the letter at the altar in the Portuguese language; and the secretary interpreted it in that of the country. The queen, who had stood all the while it was reading, went towards the altar, and on her knees received it from the father; and having kissed it, and sworn afresh upon the gospel to continue in obedience to the church of Rome, kissed the letter again, put it into the purse, and returned to the palace amidst the shouts and acclamations of many thousands of her subjects. On that day she gave a magnificent treat to the Portuguese resident, and to all her court, in two great porticos, and she herself vouchsafed to eat after the European manner; that is, sitting on a stately elbow chair, with a high table before her, covered with the finest linen, and with dishes, plates, knives, and forks, all of silver gilt. She bestowed some largesses upon her chief officers, released a good number of slaves, and at night appeared at the head of her ladies of honour, both she and they dressed in the Amazonian manner. They performed a kind of combat, in which the queen, tho' upwards of 80 years of age, behaved with as great vigour and activity as any woman of 30 could have done.

Her life, however, was not lengthened in proportion to her vigour and activity: for in the month of September she was seized with an inflammation in her throat; which, in December, having seized her breast and lungs, she expired on the 17th of that month, and was succeeded by her sister Barbara.

The deceased queen was buried with extraordinary pomp; and, out of regard to her, Barbara was inaugurated a second and third time, with the greatest pomp, and the most joyful acclamations.—She was a very zealous Christian, but far short of her sister's abilities, and had the misfortune of being in the decline of life, lame, and almost blind. Besides this, she had been married to a proud, ill-natured husband; who had dared, even in the late queen's time, to treat her not only with contempt, but with brutish cruelty; though to her he owed all his fortune and advancement, being himself no more than the son of a slave.

This ungrateful wretch, whose name was Mona Zingha, soon after his marriage with the princess Barbara, used her with such cruelty, that she was obliged to take refuge in the palace, from whence he had the insolence immediately to fetch her. This so exasperated queen

Angola.

53
Encourages
Christianity

54
Ceremonies
at receiving
a letter from
the pope.

55
Zingha dies.

56
Succeeded
by her sister
Barbara.

57
Cruelty of
her husband
Mona Zin-
gha to her.

Zingha.

Angola. Zingha, that she had well nigh ordered him to be cut in pieces before her face; but pardoned him at the request of father Anthony, who probably knew he was privy to some religious secrets which he might, in a case of such emergency, have disclosed. On Barbara's accession to the throne, however, he not only redoubled his cruelty to her, in hopes of getting the management of affairs entirely into his own hands, but invented the most hellish accusations against Anthony himself, with a design to extirpate both him and his religion. He gave out that the late queen had been poisoned by some favourite European dishes, with which brother Ignatio used to regale her during her last illness; and attributed his wife's lameness and blindness to some sorceries or charms used by the convent against her. He had even persuaded, or rather forced, his queen to consent that some of the singhillos or priests should be brought to countercharm her distemper.

58
He accuses
Father An-
thony.

59
Who reprimands the
Queen.

Father Anthony, far from being intimidated at the accusations brought against him, repaired immediately to the palace; where he boldly reprimanded the queen for giving ear to these jugglers, threatening at the same time to leave her dominions, and carry off with him all the crosses, and other religious utensils, from which alone they could have any benefit. The queen returned a very submissive answer; and promised to deliver up the counter-charms which she at that time had upon her, before sunset; which she accordingly did, and sent them to the convent by the hands of her secretary. This so exasperated her husband, and all the Giagan sect, that they resolved upon the destruction of all the priests and Europeans, and even the queen herself. This, however, was found improper to be attempted; and Mona Zingha was so much chagrined at his disappointment, that he retired to his own estate; giving out, that he designed to meddle no more with state-affairs; but, in reality, to concert measures for engrossing the sovereignty to himself, and to deprive his wife of her life and crown.

To accomplish his wicked purpose, he sent a messenger to her, desiring her to repair to his house, where he had something of importance to communicate; but she declining the invitation by the advice of father Anthony, he found himself disappointed, and begged leave to retire to a neighbouring province, which was under his government; but here he was again disappointed, and forbid to stir out of the province of Metamba. The queen was, however, guilty of an error not long after, in sending Mona Zingha at the head of an army to quell a revolt on the frontiers. On his returning victorious, he thought himself strong enough to revive the ancient Giagan rites, and therefore ordered 100 slaves to be sacrificed to the manes of the deceased queen. Though the queen was immediately apprised of his intention, and dispatched a messenger expressly commanding him to desist; yet Monr, by distributing some presents, particularly some European wines, among the counsellors, effected his purpose with impunity. He did not forget to send some of this wine to father Anthony; but, to prevent suspicion, presented him only with a small quantity, to be used, as he said, at the mass; adding, that, if it proved agreeable, he would supply him with a larger quantity. The unsuspecting priest drank about two glasses of it; and in about a quarter of an hour was seized with violent convulsions in his bowels, and other

symptoms of being poisoned. By proper assistance, however, he recovered; yet so far was he disabled by this dose, that he was obliged to abandon his mission.

The queen's infirmities in the mean time daily increasing, Mona Zingha was soon delivered from all further opposition on her part, by her death, which happened on the 24th of March, 1666. Upon this, Mona Zingha made all possible haste to get himself elected king; and immediately renounced the Christian religion, raising a persecution at the same time against its professors. He even wrote to the Portuguese viceroy, acquainting him with his having renounced Christianity, which he had only embraced out of complaisance to his queen, and with his design to revive the Giagan rites. To shew that he meant to be as good as his word, he ordered all the children under six years of age, that could be found, to be sacrificed in honour of their infernal deities. He also recalled the singhillos, and heaped many favours upon them; so that they became entirely devoted to his purposes. He also caused many of his subjects to be privately poisoned; and then gave out, that their unaccountable deaths were owing to their having abandoned the religion of their ancestors, and embraced Christianity; which he styled the religion of a parcel of famished strangers, who, thro' their extreme misery, had been forced to leave their native country, and seek for a livelihood in the richest provinces of Africa.

By these and such like stratagems he almost entirely extirpated Christianity, and any appearances of civilization which had been introduced among his subjects. His career, however, was stopped by Don John the prince's Barbara's first husband, from whom she had been divorced on account of his having another wife. He soon compelled the usurper to fly into an island in the Coanza; but not having the precaution to reduce him entirely, Mona Zingha found means to retrieve his affairs, and at last defeated and killed Don John himself, by which he became master of the throne without any further opposition. He was no sooner re-established, than he began to pursue his butcheries with more fury than ever; when, on a sudden, Don Francisco, the son of Don John, appeared at the head of an army in opposition to the usurper; and in the first engagement Mona Zingha being defeated and killed, Don Francisco became sole master of the empire.

Here we are obliged to conclude our history; no further accounts, which can be depended upon, having ever appeared; neither is it known whether this prince kept to the terms of the alliance made by Queen Zingha with the Portuguese or not.—Certain it is, however, that the Portuguese have preserved their conquests, and for some time allowed the natives of these provinces which are under their power to chuse a king for themselves, or rather they chose him for them, as we have already noticed. These kings enjoyed only a mere shadow of royalty; their whole grandeur consisting in being allowed to breed peacocks, and adorn themselves with their feathers, which was forbidden to their subjects under pain of perpetual slavery.—The last of these kings was named Ngola Sedesio, who, disliking an empty name of royalty, revolted from the Portuguese, and carried on a long war with them; but being at last defeated and killed, his head was cut off, salted, and sent to Lisbon in pickle. After this the Portuguese

Angola.

62
The Queen
dies.

63
Horrid
cruelties of
Mona Zin-
gha.

64
He is de-
fied and
cd.

65
Low fl-
the kin-
up by t-
Portug.

60
Mona Zin-
gha revives
the Giagan
rites.

61
And poi-
sons Father
Anthony.

Angola.

tuguese felt not to have thought it safe to trust their Angolic subjects even with the name of a king of their own, but have vested the power entirely in their viceroy; but as to the extent of his dominions, and how matters stand between him and that race of Angolic princes who have preferred their liberty, we are entirely in the dark.

Division in provinces.

Being so much in the dark as to these particulars, it is impossible we can say any thing with regard to the division of the present kingdom, or the extent and number of its provinces. When in its greatest splendor, the kingdom of Angola contained the 17 following provinces: Chessama, Sumbi, Benguela, Rimba, Sietta, High and Low Bembea, Temba, Oacco, Cabezzo, Lubolo, Loanda, Bengo, Danda, Moficte, Higher and Lower Ilamba, Orari, and Embacca. The provinces conquered by the Portuguese during the wars abovementioned were, Danda, Moficte, Bengo, the higher and lower Ilamba, Orari, Embacca, Benguela, Sietta, Cabezzo, Lubolo, and Oacco. Of all these we have given a particular description under their respective names.

Rivers.

The principal rivers in this kingdom are those already mentioned, viz. the Danda and Coanza. The Coanza is large, deep, and rapid. It empties itself into the Atlantic ocean about Latitude $9^{\circ} 20'$ S. twelve leagues south of Loando the capital of the kingdom. It is navigable for 150 miles, and abounds with variety of fish. It forms several islands, has some cataracts, and one in particular which bears its name. As for its source, and the length of ground it crosses from east to west before it comes to the Portuguese settlement, it is absolutely unknown, as well as the countries thro' which it runs. Its mouth, which runs between the capes Palmerino and Lego, is above a league wide; the northern shore is the deepest, and along which the vessels sail. The fall of this river into the ocean is so rapid, that the sea appears quite muddy for two or three leagues below it. Its mouth is not easily perceived from the open sea, by reason of an island quite covered with high trees which lies just before it. The two principal islands formed by this river are called *Maffander* and *Motchiamia*. The one is six leagues long, and about two miles broad: it is very fertile in maize, millet, and some other grains, which are reaped at three different seasons of the year. It produces likewise vast quantities of manhioc, a root, of which they make a coarse kind of meal, which serves instead of bread. Here also grow great numbers of palm and other fruit trees of various kinds. The island of Motchiamia is four or five miles long, and one in breadth, mostly plain, and producing variety of roots and herbs. It likewise abounds in cattle; and there were formerly five or six Portuguese families settled upon it, who drove a considerable trade in these commodities, and likewise in slaves.

Concerning the river Danda we know little or nothing: only, that though its mouth is not above 70 or 80 miles distant from that of the Coanza, yet their distance grows so considerably wider as you penetrate further into the inland, as to be much above twice if not thrice that space; though how much, is not exactly known.

As for cities, there are none in this kingdom, except what belong to the Portuguese; and even of these

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we know little or nothing. Queen Zingha indeed founded a city in the kingdom of Metamba, of which a description is given under that article. The manner, religion, and dress, &c. of the inhabitants, being a mix of those of the Congoese and Giagas, fall to be mentioned under these two articles.

ANGOLA *Pea*, the name of a shrub much cultivated in the West Indies, whither it was brought from Africa, of which it is a native. It grows to the height of four feet, lives four years, and is useful throughout its whole duration. It bears husks, which contain five or six grains of a species of a very wholesome and very nourishing pea. Every part belonging to this shrub is remarkable for some particular virtue. Its blossom is good for a cough; its leaves, when boiled, are applied to wounds; and of the ashes of this plant is made a lixivium, which cleanses ulcers, and dissipates external inflammations of the skin. It flourishes equally in lands naturally barren, and in those which have been exhausted. For this reason, the best managers amongst the colonists never fail to sow it on all those parts of their estates, which in other hands would remain uncultivated.

ANGON, in the ancient military art, a kind of javelin used by the French. They darted it at a considerable distance. The iron head of this weapon resembled a flower-de-luce. It is the opinion of some writers, that the arms of France are not flowers-de-luce, but the iron point of the angon or javelin of the ancient French.

ANGOR, among ancient physicians, a concentration of the natural heat; the consequence of which is a pain of the head, palpitation, and sadness.

ANGOT, a province or kingdom of Abyssinia, formerly rich and fertile, but almost ruined by the Gallas, a wandering nation in the internal parts of Africa, who dispossessed the Abyssinian monarchs of all that was worth possessing.

ANGOULESME, a city of France, the capital of the duchy of Angoumois, and the see of a bishop. It is seated on the top of a hill, surrounded with rocks, at the foot of which runs the river Charante. The inhabitants are said to be about 8000, and to drive a considerable trade in paper, which is their manufacture. E. Long. o. 10. N. Lat. $45^{\circ} 39'$.

ANGOUMOIS, a province of France, bounded on the north by Poitou, on the east by Limouin and March, on the south by Perigord, and on the west by Saintonge. Through this province run the rivers Touvre and Charante. This last is full of excellent fish; and though it often overflows its banks, it is so far from doing any damage, that it greatly enriches the soil. The Touvre is full of trouts. The air is generally warmer than at Paris, though the country is hilly. The soil produces plenty of wheat, rye, oats, Spanish corn, saffron, grapes, and all sorts of fruits. Here are several iron mines, which yield a very good sort of iron.

ANGOURA, ANGORA, or ANGORI, a city of Asia, in Anatolia, formerly called *Ancyra*, and still full of remarkable antiquities, which are so many marks of its ancient magnificence. It is at present one of the best cities in Anatolia; its streets are full of pillars and old marbles, among which are some of porphyry and jasper. The greatest part of the pillars are smooth and cylindrical; some are channelled spirally; but the most

I i i

singular

Angola
Angourra.

Angoy.

singular are oval, with plate-bands before and behind from the top to the bottom of the pedeflal. The houses are now made of clay, which is sometimes intermixed with fine pieces of marble. The walls of the city are low, with very mean battlements. The masonry of the walls is intermixed with pillars, architraves, capitals, and other ancient fragments, especially that of the towers and gates. The castle of Angora has a triple inclosure; and the walls are of large pieces of white marble, and a stone much like porphyry.

The basha of Angora has about 30 purfes income; and there are here about 300 janizaries, under the command of a fardar. The Turks are said to be 40,000, the Armenians 4000 or 5000, and the Greeks 600. The Armenians have seven churches, besides a monastery; and the Greeks two. They breed the finest goats in the world; and their hair, which is of a dazzling white, is almost as fine as silk, and nine inches in length: it is worked into very fine fluffs, particularly camblet. All the inhabitants are employed in this manufacture. Several large caravans pass through this city to different places. E. Long. 32. 5. N. Lat. 39. 30 *

* See Angora

ANGOY, a kingdom of Loango in Africa, bounded on the north by Cacongo, and on the south by Congo; from the former of which it is separated by the river Cabinda, and from the latter by the river Zaire. It is but of small extent; being only a vassal province of Cacongo, till the mani or prince, who had married a Portuguese's daughter, was persuaded by his father-in-law to make himself independent. This he effected at a favourable juncture, the king of Loango having but just before revolted from the king of Congo, and the king of Cacongo from the new king of Loango. The country is full of woods and thickets; and has no towns of any note, except one called Bomangoy, situated on the north banks of the Zaire, and not far from its mouth. Its chief port is Cabinda, called also Kabenda, or Cubenda, situated on the mouth of a river of the same name about five leagues north of Cape Palmerino, on the north side of the Zaire's mouth. The bay is very commodious for trade, or wooding and watering along the shore. It is flat and marshy in some places; but ascends gradually about three miles inland, and then forms itself into a ridge of hills. On the ascent of these is situated a town belonging to the father-in-law of the king above mentioned, where he constantly kept a stock of wood ready cut, to sell to foreign ships at an easy rate. From these wood-piles, south-west along the bay, lie scattered a number of fishermen's huts, on each side a small fresh water river which falls into the bay; and thence all the water for ships is brought in casks to the mouth of the river, which is so shallow, that even at full flood it can only be entered by a yawl carrying a cask or two. The town stands on the round point of the bay looking to the westward; and the English have a factory on the south-west of the road. For a description of the town itself, see the article CABINDA.

The country round the bay is mostly barren; owing chiefly to the laziness of the inhabitants, which often occasions a scarcity of provisions. The wild beasts swarm so in the woods, that they destroy all the tame kinds; so there are no cattle bred here but hogs. From the woods in this country some monkeys have been brought away, which in shape and stature resembled the

human species. Civet-cats abound here in great plenty, and parrots may be bought for three or four ordinary knives. The coasts abound so with oysters, that the sailors quickly load their boats with them; they being found lying in great heaps like small rocks. The natives follow the occupation of fishing more than any other. They fish both on the sea and in the rivers, making use of drag-nets, which have long canes fixed at equal distances, instead of corks, to shew when any fish is caught. These nets are made of a peculiar kind of root, which, after being beaten, may be spun like hemp.

The dress of the inhabitants is the same with that of the Congolese. They allow polygamy, and the best beloved wife hath the command of the rest; but is no less liable to be turned out, if she proves unfaithful. The ladies of the blood-royal have the privilege of clausuring their husbands out of any, even the meanest rank; and have even the power of life and death over them; as likewise over their paramours, if any of them are caught tripping; but the husbands are by no means entitled to expect the same fidelity from their royal ladies. Women of the lower rank are obliged, when they receive a stranger, to admit them for a night or two into their embraces. This obliged the missionaries, who travelled through this country, to give notice of their approach to any of their houses, that none of the female sex might enter within their doors.—Their religion consists chiefly in a variety of superstitious customs; such as powdering their public and domestic idols with the dust of a kind of red wood, on the first day of the moon, and paying a kind of worship to that planet. If, on that night, it happens to shine clear and bright, they cry out, "Thus may I renew my life as thou dost;" but if the air is cloudy, they imagine the moon hath lost her virtue, and pay her no respect. We do not hear of their offering any sacrifices to their idols; though they commonly consult them about the success of their enterprises, thefts, or such like. The king of Congo still styles himself sovereign of Angoy; but the king of this little state pays neither tribute nor homage to any foreign power.

ANGRA, a city of Tercera one of the Azores, the capital not only of that island, but of all the rest, and is the residence of the governor. It is seated on the south side, near the middle of the longest diameter of the island, on the edge of the sea. The harbour is the only tolerable one in the whole island, being equally secure against storms and the efforts of an enemy. It is of the form of a crescent; the extremities of which are defended by two high rocks, that run so far into the sea as to render the entrance narrow, and easily covered by the batteries on each side. From this harbour the town is said to derive its name, the word *Angra* signifying a creek, bay, or station for shipping; and this is the only convenient one among all the Azores. The opening of the port is from the east to the south-west; and, according to Frezier, it is not above four cable's-length in breadth, and not two of good bottom. Here ships may ride in great safety during the summer; but as soon as the winter begins, the storms are so furious, that the only safety for shipping is the putting to sea with all possible expedition. Happily, however, these storms are preceded by infallible signs, with which experience has made the inhabitants perfectly well acquainted. On these occasions

Angoy

Angra.

Angrivarii
||
Anguilla.

sons the Pico, a high mountain in another of the Azores, is overcast with thick clouds, and grows exceedingly dark; but what they look upon as the most certain sign is the fluttering and chirping of flocks of birds round the city for some days before the storm begins.

The town is well-built and populous, is the see of a bishop, under the jurisdiction of the archbishop of Lisbon. It hath five parishes, a cathedral, four monasteries, as many nunneries, besides an inquisition and bishop's court, which extends its jurisdiction over all the Azores, Flores, and Corvo. It is surrounded by a good wall, a dry ditch of great depth and breadth, and defended by a strong castle rendered famous by the imprisonment of king Alphonso by his brother Peter in 1668. Though most of the public and private buildings have a good appearance externally, they are but indifferently furnished within; but for this poverty the Portuguese excuse themselves, by saying, that too much furniture would prove inconvenient in so warm a climate.

At Angra are kept the royal magazines for anchors, cables, sails, and other stores for the royal navy, or occasionally for merchantmen in great distress. All maritime affairs are under the inspection of an officer called *Defenbergrador*, who hath subordinate officers and pilots for conducting ships into the harbour, or to proper watering-places. The English, French, and Dutch, have each a consular residing here, though the commerce of any of these nations with the Azores is very inconsiderable.

ANGRIVARII, (Tacitus), a people of Germany, situated between the Weser and the Ems, and eastward reaching beyond the Weser, as far as the Cherufci, on which side they raised a rampart (Tacitus); to the south, having the Tubantes on the Ems, and on the Weser where it bends to the forest Bacemis; to the west, the Ems and the confines of the Bructeri; and to the north, the territory of the Angrivarii lay between the Chamavi and Anfibarii. Ptolemy places them between the Cauchi and Suevi or Catti. Supposed now to contain a part of the county of Schaumburg, the half of the bishoprick or principality of Minden; to the south, the greatest part of the bishoprick of Osnabrug, the north part of the county of Teelenburg, and a part of the county of Ravenberg. A trace of the name of the people still remains in the appellation *Engern*, a small town in the county of Ravenberg.

ANGROGNA, a town of Piedmont, belonging to the king of Sardinia. E. Long. 7. 2. N. Lat. 48. 42.

ANGUILLA, one of the West-India or Carribbee islands, lying in about 15° N. Lat. It has its name from its snake-like form; and is about ten leagues in length, and three in breadth. It was first discovered by the English in 1650, when it was filled with alligators and other noxious animals; but they, finding the soil fruitful, and proper for raising tobacco and corn, settled a colony on it, and imported live cattle, which have since multiplied exceedingly. But the colony not being settled under any public encouragement, each planter laboured for himself, and the island became a prey to every rapacious invader, which disheartened the inhabitants so much, that all industry was lost among them. Their chief suffering was from a party of wild Irish, who landed here after the Revolution, and treated them worse than any of the French pirates who had attacked them before. The people of Barbadoes, and other En-

glish Carribbees, knowing the value of the soil, several of them removed to Anguilla, where they remained for many years, and even carried on a profitable trade, though without any government either civil or ecclesiastical. In 1745, their militia, though not exceeding 100 men, defended a breast-work against 1000 French who came to attack them; and at last obliged them to retire with the loss of 150 men, besides carrying off some of their arms and colours as trophies of their victory. Since that time the inhabitants have subsisted mostly by farming; though they still plant sugar, and the island is said to be capable of great improvements.

ANGUINA. See TRICOSANTHES.

ANGUILLIFORM, an appellation given by zoologists, not only to the different species of eels, but to other animals resembling them in shape.

ANGUINUM OVUM, a fabulous kind of egg, said to be produced by the saliva of a cluster of serpents, and possessed of certain magical virtues. The superstition in respect to these was very prevalent among the ancient Britons, and there still remains a strong tradition of it in Wales. The account Pliny * gives of it is as follows:

* Lib. xxix.
C. 3.

“Præterea est ovorum genus in magna Galliarum fama, omnium Græciis. Angues innumeri æstate convoluti, falivis faucium corporumque spumæ artificii complexu glomerantur; anguinum appellatur. Druidæ libilis id dicunt in sublime jactari, fagocque oportere intercepti, ne tellurem attingat: profugere raptorem equo: serpentes enim insequi, donec arceantur amnis alicujus interventu.”—Of which the following may serve as a translation: (from *Mafon's Caradacus*; the person speaking, a Druid.)

But tell me yet
From the grot of charms and spells,
Where our matron sister dwells,
Brennus, has thy holy hand
Safely brought the Druid wand,
And the potent *Adder-sione*,
Gender'd 'fore the autumnal moon?
When, in undulating twine,
The foaming snakes prolific join;
When they hiss, and when they hear
Their wondrous egg aloof in air:
Thence before to earth it fall,
The *Druid* in his hallow'd pall,
Receives the prize,
And instant flies,
Follow'd by the evenom'd brood,
"Till he crosses the crystal flood.

This wondrous egg seems to be nothing more than a bead of glass, used by the Druids as a charm to impose on the vulgar, whom they taught to believe, that the possessor would be fortunate in all his attempts, and that it would gain him the favour of the great.

Our modern Druidesses (says Mr Pennant, from whom we extract) give much the same account of the *ovum anguinum*, *glain neidr*, as the Welsh call it, or the *adder-gem*, as the Roman philosopher does; but seem not to have so exalted an opinion of its powers, using it only to assist children in cutting their teeth, or to cure the chin-cough, or to drive away an ague.

These beads are of a very rich blue colour; some plain, others streaked. For their figure, see Plate XXIV. (b). fig. 22. n° 1, 2, 3.

ANGUIS, or SNAKE, in zoology, a genus belonging to the order of amphibia serpentes. The characters of the anguis are these: They are squamous or

I i i 2 scaly

Anguis.

scaly in the belly and under the tail; without any scuta. There are 15 species of the anguis, viz. 1. The cryx, a native of Britain and likewise of America, is about a span in length, and about the thickness of a man's finger. One from Aberdeenshire, described by Mr Pennant, was 15 inches long; tongue broad and forked; nostrils small, round, and placed near the tip of the nose; eyes lodged in oblong fissures above the angle of the mouth; belly of a bluish lead colour, marked with small white spots irregularly disposed: The rest of the body of a greyish brown, with three longitudinal dusky lines; one extending from the head along the back to the point of the tail; the others broader, and extending the whole length of the sides. It was entirely covered with small scales; largest on the upper part of the head. 2. The fragilis, blind-worm, or slow-worm, grows to about a foot in length, and to the thickness of a man's little finger: the irides are red; the head is small; the neck still more slender; from that part the body grows suddenly, and continues of an equal bulk to the tail, which ends quite blunt. The colour of the back is cinereous, marked with very small lines composed of minute black specks: the sides are of a reddish cast; the belly dusky; both marked like the back. The tongue is broad and forked; the teeth are minute, but numerous; the scales small. The motion of this serpent is slow, from which, and from the smallness of the eyes, are derived its names. It resembles the viper in the manner of producing its young, which are put forth alive. It is frequent with us in gardens and pastures, where it lives principally under ground feeding on worms. Like others of the genus, they lie torpid during winter, and are sometimes found in vast quantities twisted together. 3. The ventralis, or glass-snake of Catsby, has 127 squamæ on the belly, and 223 on the tail. The head is very small, and the tongue of a singular form *. The upper part of the body is of a colour blended brown and green, most regularly and elegantly spotted with yellow, the undermost part of which is brightest. The skin is very smooth; and shining with small scales, more closely connected, and of a different structure from those of other serpents. A small blow with a stick will cause the body to separate, not only at the place struck, but at two or three other places, the muscles being articulated in a singular manner quite through to the vertebra. They appear earlier in the spring than any other serpent, and are numerous in the sandy woods of Virginia and Carolina. They are generally said to be harmless. 4. The jaculus, or dart-snake, is about three hand-breadths long, and about the thickness of one's little finger. Its colour is a milky grey on the back, variegated with small black spots like so many eyes; and on the belly it is perfectly white. The neck is wholly black; and from that two milk-white streaks run all the way along the back to the tail: the black spots also are each surrounded with a small circle of white. It has its name from its vibrating its body in the manner of a dart. It is a native of Egypt, Libya, and the islands of the Mediterranean. 5. The quadrupes: The body of this species is cylindrical, with 14 or 15 longitudinal ash-coloured streaks; the teeth are extremely small; it has no ears: the feet are at a great distance from each other, very short, with five toes and small nails; but the toes are so minute, that they can hardly be numbered: It is a native of

Java. 6. The bipes, is a native of the Indies; it has two short feet, with two toes, near the anus. In every scale of the bipes there is a brown point. 7. The meagris, is likewise a native of the Indies; it has small teeth, but no ears. This species has a great resemblance to the former *. 8. The colubrina, an inhabitant of Egypt, is beautifully variegated with pale and yellow colours. 9. The maculata, a native of America, is yellow, and interspersed with ash-coloured lines on the back: the head is small in proportion to the body †. 10. The reticulata, a native of America, has brownish scales, with a white margin. 11. The cerasus, with 200 squamæ on the belly, and 15 on the tail, is a native of Egypt. 12. The lumbricalis, a native of America, has 230 squamæ on the belly, and 7 on the tail; its colour is a yellowish white. 13. The platyrus: The head is oblong and without teeth; the body is about a foot and a half long, black above and white below; the tail is about one ninth of the length of the animal, much compressed or flattened, and variegated with black and white; the scales are roundish, small, not imbricated, but they cannot be numbered. 14. The laticauda, a native of Surinam: the tail is compressed, acute, pale, with brownish belts. 15. The scytale, a native of the Indies, with 220 squamæ on the belly, and 13 on the tail. The head is small and oval, and the eyes are little; the body is cylindrical, about a foot and a half long, covered with oval obtuse scales: the tail is thick and obtuse like the head; its colour is white, interspersed with brownish rings; the margins of the scales are of an iron colour; and the top of the head is blue ‡.—According to Linnæus, § Fig. 3. none of this genus are poisonous.

ANGURIA, the WATER-MELON; a genus of the diandria order, belonging to the monoecia class of plants.

Species. Of this genus, Linnæus reckons three species, the trilobata, pedata, and trifoliata; but only one is known in this country, by the name of *Citrul*. The fruit is cultivated in Spain, Portugal, Italy, and other warm countries of Europe; as also in Africa, Asia, and America; where it is esteemed on account of its wholesome cooling quality; but in Britain it is held in little estimation.

Culture. To have this fruit good, some seeds must be procured of three or four years old; new seeds being apt to produce vigorous plants, which are seldom so fruitful as those of a moderate strength. These are to be sown in the hot-bed for early cucumbers. Some new dung is to be prepared in the beginning of February, which should be thrown into a heap to heat, as is practised for early cucumbers. The bed is then to be made in the same manner as for the muck-melon, covering the dung about five inches thick with loamy earth; but as these plants require much more room than either cucumbers or common melons, there should be but one plant put into a three-light frame. A hill of the same loamy earth should therefore be raised a foot and a half high, in the middle light of each frame; into which, when the bed is of a proper temper for heat, the plants should be carefully planted, observing to water and shade them until they have taken good root. As to other particulars, their management differs very little from that of the muck-melon: only they must frequently have fresh air admitted to them; and, when

Anguis.
||
Anguria.* Plate xiii.
fig. 1.

† Fig. 2.

§ Fig. 3.

* Plate xxi.
fig. 5.

Fig. 1. ANGUIS MELEAGRIS

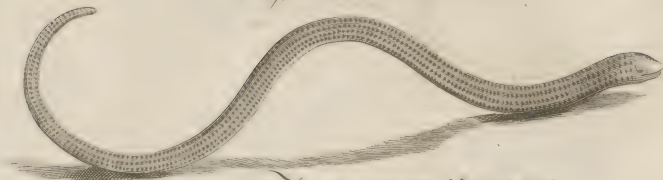


Fig. 2. ANGUIS MACULATA

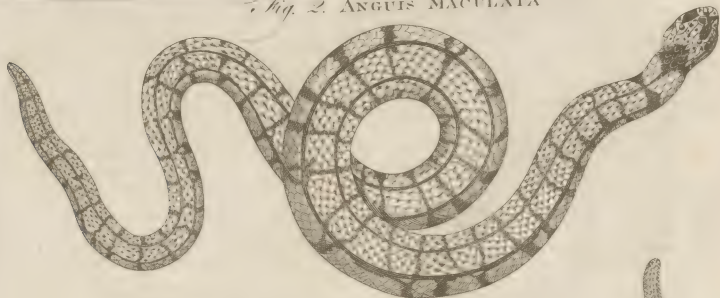


Fig. 3. ANGUIS SCYTALIS

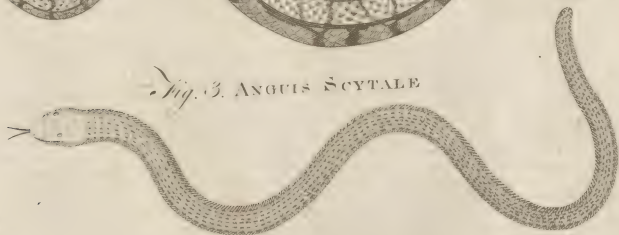


Fig. 4. APHRODITA





Angus
animal.

when the nights are cold, the glasses must be covered with mats to keep the beds warm.

ANGUS. See FORFARSHIRE.

ANGUSTICLAVIA, in Roman antiquity, a tunica embroidered with little purple studs. It was worn by the Roman knights, as the laticlavia was by the senators.

ANHALT, an island of Denmark, in North Jutland, lying in the Categut, eight miles from the coast of Jutland, ten from Zealand, and seven from Holland. It is dangerous for seamen, for which reason there is a light-house.

ANHALT, a principality of Germany, in the circle of Upper Saxony, about 42 miles in length, and eight in breadth. It is bounded on the S. by the county of Mansfield, on the W. by the duchy of Halberstadt, on the E. by the duchy of Saxony, and on the N. by the duchy of Magdeburg. It abounds in corn, and is watered by the Salde and Mulda; its principal trade is in beer.

ANHELATIO, or ANHELITUS, among physicians, a shortness of breath.

ANIAN, the name of a strait formerly supposed to lie between the north-east of Asia, and the north-west of America; but now found to exist only in imagination.

ANIAN is also the name of a barren sandy desert lying on the east coast of Africa. It is so excessively hot and otherwise inhospitable, that it contains but very few inhabitants, except some wandering Arabs who live in camps.

ANJENGO, a small town and factory on the coast of Malabar, in the peninsula on this side the Ganges, belonging to the East India company. Their merchandise consists chiefly in pepper and calicoes. E. Long. 76. 1. N. Lat. 7. 0.

ANIL, in botany, a synonyme of a species of indigotera. See INDEGOTERA.

ANIMA, among divines and naturalists, denotes the soul, or principle of life, in animals. See SOUL.

ANIMA, among chemists, denotes the volatile or spiritous parts of bodies.

ANIMA Hepatis, is a name by which some call *sal martis*, or salt of iron, on account of its supposed efficacy in diseases of the liver.

ANIMA Saturni, a white powder obtained by pouring distilled vinegar on litharge, of considerable use in enamelling. See ENAMEL.

ANIMADVERSION, in matters of literature, is used to signify, sometimes correction, sometimes remarks upon a book, &c. and sometimes a serious consideration upon any point.

ANIMAL, in natural history, an organized and living body, which is also endowed with sensation: thus, minerals are said to grow or increase, plants to grow and live, but animals alone to have sensation.

It is this property of sensation alone that can be deemed the essential characteristic of an animal; and by which the animal and vegetable kingdoms seem to be so essentially separated, that we cannot even imagine the least approximation of the one to the other. Those naturalists, indeed, who have supposed the distinction between animals and vegetables to consist in any thing else than what we have already mentioned, have found themselves greatly embarrassed; and have generally a-

Animat.

greed, that it was extremely difficult, if not impossible, to settle the boundaries between the animal and vegetable kingdoms. But this difficulty will be easily seen to arise from their taking the characteristic marks of the animal kingdom, from something that was evidently common to both. Thus, Boerhaave attempted to distinguish an animal from a vegetable, by the former having a mouth, which the latter has not: but here, as the mouth of an animal is only the instrument by which nourishment is conveyed to its body, it is evident, that this can be no essential distinction, because vegetables also require nourishment, and have instruments proper for conveying it into their bodies; and where the end is the same, a difference in the means can never be essential. The fixing the difference in an animal's having a gula, stomach, and intestines, as is done by Dr Tyson, is as little to the purpose.

The power of moving from one place to another, hath by many been thought to constitute their difference; and indeed, in most cases, it is the obvious mark by which we distinguish an animal from a vegetable: but Lord Kaimes hath given several very curious instances of the locomotive power of plants; some of which, as he says, would do honour to an animal.—“ Upon the slightest touch, the sensitive plant shrinks back and folds up its leaves, similar to a snail; which on the slightest touch retires within its shell. A new species of the sensitive plant hath been lately discovered*. If a fly perch upon one of its flower-leaves, it closes instantly, and crushes the insect to death. There is not an article in botany more admirable than a contrivance, visible in many plants, to take advantage of good weather, and to protect themselves against bad. They open and close their flowers and leaves in different circumstances: some close before sunset, some after: some open to receive rain, some close to avoid it. The petals of many flowers expand in the sun; but contract at night, or on the approach of rain. After the seeds are fecundated, the petals no longer contract. All the trefoils may serve as a barometer to the husbandman; they always contract their leaves on an impending storm. Some plants follow the sun, others turn from it. Many plants, on the sun's recess, vary the position of their leaves, which is styled the *sleep of plants*. A singular plant † was lately discovered in Bengal. Its leaves are in continual motion all day long; but when night approaches, they fall down from an erect posture to rest.

“ A plant has a power of directing its roots for procuring food. The red whortle-berry, a low evergreen plant, grows naturally on the tops of our highest hills, among stones and gravel. This shrub was planted in an edging to a rich border, under a fruit wall. In two or three years, it over-ran the adjoining deep-laid gravel walk; and seemed to fly from the border, in which not a single runner appeared. An effort to come at food in a bad situation, is extremely remarkable in the following instance. Among the ruins of Newabbey, formerly a monastery in Galloway, there grows on the top of a wall a plane-tree about 20 feet high. Straitened for nourishment in that barren situation, it several years ago directed roots down the side of the wall, till they reached the ground ten feet below; and now the nourishment it afforded to those roots during the time of their descending is amply repaid, having every year since that time made vigorous shoots. From the top of

* See Dionae.

† A species of the *Hedyotum*. See that article.

the wall to the surface of the earth, these roots have not thrown out a single fibre; but are now united in a single root.

"Plants, when forced from their natural position, are endowed with a power to restore themselves. A hop-plant, twisting round a stick, directs its course from fourth to west, as the sun does. Untwist it, and tie it in the opposite direction: it dies. Leave it loose in the wrong direction: it recovers its natural direction in a single night. Twist a branch of a tree so as to invert its leaves, and fix it in that position: if left in any degree loose, it untwists itself gradually, till the leaves be restored to their natural position. What better can an animal do for its welfare? A root of a tree meeting with a ditch in its progress, is laid open to the air. What follows? It alters its course like a rational being, dips into the ground, surrounds the ditch, rises on the opposite side to its wonted distance from the surface, and then proceeds in its original direction. Lay a wet sponge near a root laid open to the air; the root will direct its course to the sponge. Change the place of the sponge; the root varies its direction. Thrust a pole into the ground at a moderate distance from a scandent plant: the plant directs its course to the pole, lays hold of it, and rises on it to its natural height. A honeysuckle proceeds in its course, till it be too long for supporting its weight; and then strengthens itself by shooting into a spiral. If it meet with another plant of the same kind, they coalesce for mutual support; the one screwing to the right, the other to the left. If a honeysuckle twig meets with a dead branch, it screws from the right to the left. The clasps of briony shoot into a spiral, and lay hold of whatever comes in their way for support. If, after completing a spiral of three rounds, they meet with nothing, they try again by altering their course."

By comparing these and other instances of seeming voluntary motion in plants, with that share of life where-with some of the inferior kinds of animals are endowed, we can scarce hesitate at ascribing the superiority to the former; that is, putting sensation out of the question. Muscles, for instance, are fixed to one place as much as plants are; nor have they any power of motion, besides that of opening and shutting their shells; and in this respect they have no superiority over the motion of the sensitive plant; nor doth their action discover more sagacity, or even so much as the roots of the plane-tree mentioned by Lord Kames.

Mr Buffon, who seems to be desirous of confounding the animal and vegetable kingdoms, denies sensation to be any essential distinction. "Sensation (says he) more essentially distinguishes animals from vegetables: but sensation is a complex idea, and requires some explication. For if sensation implied no more than motion consequent upon a stroke or an impulse, the sensitive plant enjoys this power. But if, by sensation, we mean the faculty of perceiving and comparing ideas, it is uncertain whether brute animals are endowed with it. If it should be allowed to dogs, elephants, &c. whose actions seem to proceed from motives similar to those by which men are actuated, it must be denied to many species of animals, particularly to those which appear not to possess the faculty of progressive motion. If the sensation of an oyster, for example, differed only in degree from that of a dog; why do we not ascribe the same sensation to vegetables, though in a degree still

inferior? This distinction, therefore, between the animal and vegetable, is neither sufficiently general nor determined.

"From this investigation we are led to conclude, that there is no absolute and essential distinction between the animal and vegetable kingdoms; but that nature proceeds, by imperceptible degrees, from the most perfect to the most imperfect animal, and from that to the vegetables; and the fresh water polypus may be regarded as the last of animals, and the first of plants."

It were to be wished, that philosophers would on some occasions consider, that a subject may be dark as well on account of their inability to see, as when it really affords no light. Our author boldly concludes, that there is no essential difference between a plant and an animal, because we ascribe sensation to an oyster, and none to the sensitive plant; but we ought to remember, that, though we cannot perceive a distinction, it may nevertheless exist. Before Mr Buffon, therefore, had concluded in this manner, he ought to have proved that some vegetables were endowed with sensation.

It is no doubt, however, as much incumbent on those who take the contrary side of the question, to prove that vegetables are not endowed with sensation, as it was incumbent on Mr Buffon to have proved that they are. But a little attention will shew us, that the difficulty here proceeds entirely from our inability to see the principle of sensation. We perceive this principle in ourselves, but no man can perceive it in another. Why then does every individual of mankind conclude that his neighbour has the same sensations with himself? It can only be from analogy: Every man perceives his neighbour formed in a manner similar to himself; he acts in a similar manner on similar occasions; &c. Just so it is with brute animals. It is no more doubtful that they have sensations, than that we have them ourselves. If a man is wounded with a knife, for instance, he expresses a sense of pain, and endeavours to avoid a repetition of the injury. Wound a dog in the same manner, he will also express a sense of pain; and, if you offer to strike him again, will endeavour to escape, before he feels the stroke. To conclude, here, that the action of the dog proceeded from a principle different from that of the man, would be absurd and unphilosophical to the last degree.

We must further take notice, that there are sensations essentially distinct from one another; and in proportion as an animal is endowed with more or fewer of these different species, it is more or less perfect as an animal: but, as long as one of them remains, it makes not the least approach to the vegetable kingdom; and, when they are all taken away, is so far from becoming a vegetable, that it is only a mass of dead matter. The senses of a perfect animal, for instance, are five in number. Take away one of them, suppose sight; he becomes then a less perfect animal, but is as unlike a vegetable as before. Suppose him next deprived of hearing: his resemblance to a vegetable would be as little as before; because a vegetable can neither feel, taste, nor smell, and we suppose him still to enjoy these three senses. Let us, lastly, suppose him endowed only with the sense of feeling, which, however, seems to include that of taste; and he is no more a vegetable than formerly, but only an imperfect animal. If this sense is then taken away, we connect him not with the vegetable kingdom, but with what Mr Buffon calls

brute-

animal. *brute-matter.* It is to this kingdom, and not to the vegetable, that animals plainly approximate as they descend. Indeed, to suppose an approximation between the vegetable and animal kingdoms, is very absurd: for, at that rate, the most imperfect animal ought to be the most perfect plant; but we observe no such thing. All animals, from the highest to the lowest, are possessed of vegetable life; and that, as far as we can perceive, in an equal degree, whether the animal-life is perfect or imperfect: nor doth there seem to be the smallest connexion between the highest degree of vegetation and the lowest degree of sensation. Though all animals, therefore, are possessed of vegetable life, these two seem to be as perfectly distinct and incommensurate to one another, as any two things we can possibly imagine.

The power of vegetation, for instance, is as perfect in an onion or leek, as in a dog, an elephant, or a man: and yet, though you threaten a leek or an onion ever so much, it pays no regard to your words, as a dog would do; nor, though you wound it, does it avoid a second stroke. It is this principle of self-preservation in all animals, which, being the most powerful one in their nature, is generally taken, and with very good reason, as the true characteristic of animal-life. This principle is undoubtedly a consequence of sensation; and as it is never observed to take place in vegetables, we have a right to say that the foundation of it, namely sensation, belongs not to them.—There is no animal, which makes any motion in consequence of external impulse, where danger is threatened, but what puts itself in a posture of defence; but no vegetable whatever does so. A muscle, when it is touched, immediately shuts its shell; and as this action puts it in a state of defence, we conclude that it proceeded from the principle of self-preservation. When the sensitive plant contracts from a touch, it is so more in a state of defence than before; for whatever would have destroyed it in its expanded state, will also do it in its contracted state. We conclude, therefore, that the motion of the sensitive plant proceeds only from a certain property called by physicians *irritability*; and which, though our bodies possess it in an eminent degree, is a characteristic neither of animal nor vegetable life, but belongs to us in common with brute-matter. It is certain, that an electrified silk-thread shews a much greater variety of motions than any sensitive plant. If a bit of silk-thread is dropt on an electrified metal-plate, it immediately erects itself; spreads out the small fibres like arms; and, if not detained, will fly off. If a finger is brought near it, the thread feels greedily to catch at it. If a candle approaches, it claps close to the plate, as if afraid of it.—Why do we not conclude that the thread in this case is really afraid of the candle? For this plain reason, That its seeming flight is not to get away from the candle, but to get towards the electrified metal; and, if allowed to remain there, will suffer itself to be burnt without offering to stir.—The sensitive plant, in like manner, after it has contracted, will suffer itself to be cut in pieces, without making the least effort to escape. The case is not so with the meanest animal. An hedge-hog, when alarmed, draws its body together, and expands its prickles, thereby putting itself in a posture of defence. Throw it into water; and the same principle of self-preservation prompts it to expand its body, and swim. A snail, when touched,

withdraws itself into its shell; but if a little quicklime is sprinkled upon it, so that its shell is no longer a place of safety, it is thrown into agonies, and endeavours to avail itself of its locomotive power in order to escape the danger. In muscles and oysters, indeed, we cannot observe this principle of self-preservation so strongly, as nature has deprived them of the power of progressive motion: but, as we observe them constantly to use the means which nature has given them for self-preservation, we can have no reason to think that they are destitute of that principle upon which it is founded.

But there is no need of arguments drawn from the inferior creation.—We ourselves are possessed both of the animal and vegetable life, and certainly must know whether there is any connection between vegetation and sensation or not.—We are conscious that we exist; that we hear, see, &c.: but of our vegetation we are absolutely unconscious. We feel a pleasure, for instance, in gratifying the calls of hunger, and thirst; but of the process by which our aliment is formed into chyle, the chyle mixed with the blood, the circulation of that fluid, and the separation of all the humours from it, we are altogether ignorant. If we then, who are more perfect than other vegetables, are utterly insensible of our own vegetable life, why should we imagine that the less perfect vegetables are sensible of it?

To illustrate our reasoning here by an example.—The direction of the roots of the plane-tree mentioned by Lord Kaimes, shews as much sagacity, if we are to look only to the outward action, as can be observed in any motion of the most perfect animal whatever; nevertheless, we have not the least suspicion, either that the tree saw the ground at a distance, or that it was informed of its being there by the rest of its roots. If a wound is made in the body of a man, and a loss of substance is to be repaired, the same sagacity will be observed in the arrangement of the fibres, not only as if they were animated, but they will dispose of themselves seemingly with a degree of wisdom far superior to what we have any idea of; yet this is done without our having the least knowledge either how it is done, or of its being done at all. We have therefore in ourselves a demonstration, that vegetable life acts without knowing what it does: and if vegetables are ignorant of their most sagacious actions, why should we suspect that they have a sensation, let it be ever so obscure, of any of their inferior ones, such as contracting from a touch, turning towards the sun, or advancing to meet a pole?

Thus we may easily give Mr Buffon a reason why we ascribe sensation to an oyster, and none to a vegetable; namely, because we perceive the vegetable do nothing but what is also performed in our own bodies, without our having the least sensation of it; whereas an oyster puts itself in a defensive posture on the approach of danger; and this being an action similar to our own upon a like occasion, we conclude that it proceeds from the same principle of sensation. Here it may also be observed, that though the inferior animals are deficient in the number, they are by no means less in the acuteness, of their sensations; on the contrary, though a muscle or an oyster is probably endowed with no other sense than that of feeling, yet this sense is so exquisite, that it will contract upon the slightest touch, such as we would be altogether insensible of.

Animal.

Animal.

As to that power of contractility, or irritability, which is observed in some plants; our solids have it, when deprived both of vegetable and animal life: for a muscle, cut out of a living body, will continue to contract, if it is irritated by pricking it, after it has neither sensation nor vegetation.

A very good moral reason may also be adduced why we do not believe vegetables to be endowed with sensation.—Had they been so, we must suppose them to suffer pain when they are cut or destroyed; and, if so, what an unhappy state must they be in, who have not the least power to avoid the injuries daily offered them? In fact, the goodness of the Deity is very conspicuous in not giving to vegetables the same sensations as to animals; and, as he hath given them no means of defence, though we had not been told it by himself, we might have known that he gave them for food to animals; and, in this case, to have endowed them with sensation would have been a piece of cruelty. Though animals without number prey upon one another, yet all of them have some means of defence; from whence we may justly conclude, that their mutual destruction was not an original appointment of the creator, but what he forelaw would happen in a course of time, and which he therefore gave every one of them some means of guarding against. It may no doubt be here objected, that the giving some means of self defence to every animal cannot be reckoned a sufficient proof that it was not the original design of the Creator that they should be destroyed, seeing these means are not always effectual for their preservation.—This objection, however, cannot be completely obviated without a solution of the question concerning the origin of evil among the works of a perfectly good Being. But whatever difficulty there may be in solving this question, it is certain, that, as some means of self-defence is given to every animal, it has been the original design of the Creator, that, in all cases, one species of animals should not be destroyed at the pleasure of any other species; and as no means of self-defence is given to any vegetable, it is as plain, that they have been destined for a prey to every species of animals that had access to them. Philosophers have insisted much on the necessity of one animal's devouring another, that there might be room sufficient for all; but this, so far from being a system worthy of the divine wisdom, seems to us to be a reflection upon it, as if the author of nature could not have found means to preserve the life of one part of his creatures, without the destruction and misery of the rest. The sacred writings leave us at no loss to see how this carnivorous disposition came in; and, in the next world, this piece of perfection, (as the sanguinary philosophers abovementioned would have it to be), seems to be left out; for there, it is said, "They shall not hurt " nor destroy, the lion shall eat straw like the ox, and " there shall be no more pain."

When speaking of the food of plants, we took occasion to mention a certain power, totally different from that of attraction or repulsion, by which the food of a plant, after it was attracted, or otherwise brought to it, was assimilated to its substance. This power, which we there distinguish by the name of *transmutation*, be-

longs in a more eminent degree to animals. The alimentary substance is changed into two kinds of matter. (1.) An excrementitious one, which passes off through the intestines; and (2.) A fluid, which is the direct pabulum of the animal. Different substances, however, are not equally changeable by this process. The human stomach is not capable of acting upon any animal substance till it has lost its vital principle: the stomachs of some animals cannot act upon creatures of their own species: some have an apparatus for grinding their food after it is swallowed, &c. and there are no animals but what are subject to death by taking certain substances into their stomach. Some substances also, though they resist the action of the stomach, and pass unchanged into the system, produce no bad effects. Thus, madder will turn the bones of animals red; rhubarb will communicate its purgative nature to the milk, and its deep yellow colour to the urine.—All these changes, however, seem to belong to the vegetative part of our system: for as every one of them are performed without our knowledge of the manner how; and not only so, but while we are absolutely unconscious of their being done; we can have no reason to suppose, that the animal life, properly so called, is at all connected with them, any farther than as they are at present the means of preserving the creature alive, and making the connexion betwixt the principle of life and this visible creation.

The description, history, and classing of animals, makes not only a considerable, but the most excellent, part of Natural History, known by the name of *Zoology*. See the article *ZOOLOGY*.

For particulars relating to different animals, their analogous structure, sagacity, instinct, peculiarities, &c. see *COMPARATIVE ANATOMY*, *INSTINCT*, *MIGRATION*, *PAIRING*, *AMPHIBIOUS*, *BIRD*, *FISH*, *QUADRUPED*, &c. *SINGING*, *NIDIFICATION*, *VIVIPAROUS*, *OVIPAROUS*, &c.

ANIMAL, used adjectively, denotes any thing belonging to, or partaking of, the nature of animals. Thus, animal actions, those that are peculiar to animals; such are sensation and muscular motion.

ANIMAL EARTH. See *CHEMISTRY*, n° 38.

ANIMAL FLOWER, in zoology, a name given to several species of animals belonging to the genus of *Actinia* of Linneus (A). They have likewise been distinguished by the names of *Urtica Marina*, or *Sea-nettle*, from their supposed property of stinging; and *Sea-anemone*, from their claws or tentacles being disposed in regular circles, and tinged with a variety of bright lively colours, resembling the petals of some of our most beautiful flowers. As to one species, particularly, mentioned by Abbe Diequemarre, (Phil. Transf. for 1773, art 37.) the purest white, carmine, and ultramarine, are said to be scarce sufficient to express their brilliancy. The bodies of some of them are hemispherical, of others cylindrical, and of others shaped like a fig. Their substance likewise differs; some are stiff and gelatinous, others fleshy and muscular; but all of them are capable of altering their figure when they extend their bodies and claws in search of food. They are found in many of the rocky coasts of the West India

Animal
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Animal
Flower.

(A) The name of this genus happened to be omitted in the order of the alphabet. It belongs to the order of *Vermis Mollusca*; and its characters are these: The body is oblong, round, affixing itself to some other substance; the top dilatible, surrounded with numberless tentacula; mouth the only aperture, and furnished with crooked teeth.

dia islands, and likewise on some parts of the coast of England.

They have only one opening, which is in the centre of the uppermost part of the animal; round this are placed rows of fleshy claws; this opening is the mouth of the animal, and is capable of great extension. The animals themselves, though exceedingly voracious, will bear long fasting. They may be preserved alive a whole year, or perhaps longer, in a vessel of sea-water, without any visible food; but, when food is presented, one of them will successively devour two muscles in their shells, or even swallow a whole crab as large as a hen's egg. In a day or two the crab-shell is voided at the mouth, perfectly cleared of all the meat. The muscle-shells are likewise discharged whole, with the two shells joined together, but entirely empty, so that not the least particle of fish is to be perceived on opening them. An anemone of one species will even swallow an individual of another species; but, after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening also it produces its young ones alive, already furnished with little claws, which, as soon as they fix themselves, they begin to extend in search of food.

One of the extremities of the sea-anemone resembles, as we have said, the outward leaves of that flower; while its limbs are not unlike the flag or inner part of it. By the other extremity it fixes itself, as by a sucker, to the rocks or stones lying in the sand; but it is not totally deprived of the power of progressive motion, as it can shift its situation, though very slowly.

A particular species of animal-flowers has been found in some of the islands ceded to Britain at the last treaty of peace with France; and the following account of them was published in the Philosophical Transactions, vol. 57, by Mr Ellis, in a letter to Lord Hillsborough.

"This compound animal, which is of a tender fleshy substance, consists of many tubular bodies, swelling gently towards the upper part, and ending like a bulb or very small onion; on the top of each is its mouth, surrounded by one or two rows of tentacles, or claws, which when contracted look like circles of beads.

"The lower part of all these bodies have a communication with a firm fleshy wrinkled tube, which flicks fast to the rocks, and sends forth other fleshy tubes, which creep along them in various directions. These are full of different sizes of these remarkable animals, which rise up irregularly in groupes near to one another.

"This adhering tube, that secures them fast to the rock, or shelly bottom, is worthy of our notice. The knobs that we observe, are formed in several parts of it by its insinuating itself into the inequalities of the coral rock, or by grasping pieces of shells, part of which still remain in it, with the fleshy substance grown over them.

"This shews us the instinct of nature, that directs these animals to preserve themselves from the violence of the waves, not unlike the anchoring of muscles, by their fine silken filaments that end in suckers; or rather like the shelly basis of the serpula, or worm-shell, the tree-oyster, and the slipper barnacle, &c. whose bases conform to the shape of whatever substance they fix themselves to, grasping it fast with their testaceous claws, to withstand the fury of a storm.

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"When we view the inside of this animal dissected lengthwise, we find like a little tube leading from the mouth to the stomach, from whence there rise eight wrinkled small guts, in a circular order, with a yellowish soft substance in them; these bend over in the form of arches towards the lower part of the bulb, from whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleshy adhering tube, where some of them may be perceived entering into a papilla, or the beginning of an animal of the like kind, most probably to convey it nourishment till it is provided with claws: the remaining part of these slender guts are continued on in the fleshy tube, without doubt for the same purpose of producing and supporting more young ones from the same common parent.

"The many longitudinal fibres that we discover lying parallel to each other, on the inside of the semi-transparent skin, are all inserted in the several claws round the animal's mouth, and are plainly the tendons of the muscles for moving and directing the claws at the will of the animal: these may be likewise traced down to the adhering tube.

"As this specimen has been preserved in spirits, the colour of the animal, when living, cannot be certainly known; it is at present of a pale yellowish brown.

"With regard to its name, it may be called *Adinia Sociata*, or the *Cluster Animal-flower*."

The abbé Diqueumarre, by many curious, though cruel experiments related in the Phil. Trans. for 1773, has shewn that these animals possess, in a most extraordinary degree, the power of reproduction; so that scarce any thing more is necessary to produce as many sea-anemonies as we please, than to cut a single one into as many pieces. A sea-anemone being cut in two by a section through the body, that part, where the limbs and mouth are placed, eat a piece of a muscle offered to it soon after the operation, and continued to feed and grow daily for three months after. The food sometimes passed through the animal; but was generally thrown up again, considerably changed, as in the perfect sea-anemone. In about two months, two rows of limbs were perceived growing out of the part where the incision was made. On offering food to this new mouth, it was laid hold of and eat; and the limbs continually increasing, the animal gradually became as perfect as those which had never been cut. In some instances, however, he found, that, when one of these creatures was cut through, new limbs would be produced from the cut place, those at the mouth remaining as before; so that a monstrous animal was the consequence, having two mouths, and feeding at both ends. Having put some of them into a pan of water, set over a slow fire, he found that they lost their life at 50 degrees of Reaumur's thermometer. To avoid the imputation of cruelty in these experiments, the author argues the favourable consequences that have attended his operations on the sea-anemonies which have been so fortunate as to fall into his hands; as he hath not only multiplied their existence, but also renewed their youth; which last, he adds, "is surely no small advantage."

In Huges's Natural History of Barbadoes an account is also given of several species of animal-flowers. They are there described as only found in a basin in

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one particular cave; and of the most remarkable species mentioned by him we have the following description.

"In the middle of the basin, there is a fixed stone, or rock, which is always under water. Round its sides, at different depths, seldom exceeding 18 inches, are seen, at all times of the year, issuing out of little holes, certain substances that have the appearance of fine radiated flowers, of a pale yellow, or a bright straw colour, slightly tinged with green, having a circular border of thick-set petals, about the size of, and much resembling, those of a single garden-marigold, except that the whole of this seeming flower is narrower at the discus, or setting on of the leaves, than any flower of that kind.

"I have attempted to pluck one of these from the rock, to which they are always fixed; but never could effect it. For as soon as my fingers came within two or three inches of it, it would immediately contract close together its yellow border, and shrink back into the hole of the rock; but, if left undisturbed for about four minutes, it would come gradually in sight, expanding, though at first very cautiously, its seeming leaves, till at last it appeared in its former bloom. However, it would again recoil, with a surprising quickness, when my hand came within a small distance of it. Having tried the same experiment by attempting to touch it with my cane, and a small slender rod, the effect was the same.

"Though I could not by any means contrive to take or pluck from the rock one of these animals entire; yet I once cut off (with a knife which I had held for a long time out of sight, near the mouth of an hole out of which one of these animals appeared) two of these seeming leaves. These, when out of the water, retained their shape and colour; but, being composed of a membrane-like substance, surprisingly thin, it soon shrivelled up, and decayed."

The reproductive power of the Barbadoes animal-flower is prodigious. Many people coming to see these strange creatures, and occasioning some inconvenience to a person through whose grounds they were obliged to pass, he resolved to destroy the objects of their curiosity; and, that he might do so effectually, caused all the holes out of which they appeared, to be carefully bored and drilled with an iron instrument, so that we cannot suppose but their bodies must have been entirely crushed to a pulp: nevertheless, they again appeared in a few weeks, from the very same places.

Plate XXIV. fig. 1. represents the actinia sociata, or clustered animal-flower, described by Mr Ellis, with its radial tube adhering to a rock: (a) One of the animals stretching out its claws. Fig. 2. A perpendicular dissection of one of the bodies, to shew the gullet, intestines, stomach, and fibres or tendons that move the claws: (a) A young one arising out of the adhering tube. Fig. 3. The actinia alter, or animal-flower of the newly ceded islands. Fig. 4. The actinia anemone, or sea-anemone from the same place. Fig. 5. The underpart of the same by which it adheres to the rocks. Fig. 6. The actinia helianthus, or the sea-sun-flower from ditto. Fig. 7. The under part of the same. Fig. 8. The actinia dianthus, or sea-carnation, from the rocks at Hastings in Suffex. This animal adheres by its tail, or sucker, to the under part of the projecting rocks opposite to the town; and, when the tide is out, has the appearance of a long white fig: this is the form of

it when put into a glass of sea-water. It is introduced here as a new variety of this animal not yet described.

ANIMAL Spirits. See NERVOUS Fluid.

ANIMAL Substances. See CHEMISTRY, n^o 62, 519.

ANIMAL System denotes the whole class of beings endowed with animal life, otherwise called *Animal Kingdom*.

Pairing of ANIMALS. See PAIRING.

ANIMALCULE, in general, signifies a little animal; and thus the term might be applied to every animal which is considerably inferior in size to ourselves. It hath been customary, however, to distinguish by the name of *animalcules* only such animals as are of a size so diminutive, that their true figure cannot be discerned without the assistance of glasses; and more especially it is applied to such as are altogether invisible to the naked eye, and cannot even be perceived to exist but by the assistance of microscopes.

By the help of magnifying glasses, we are brought into a kind of new world; and numberless animals are discovered, which from their minuteness must otherwise for ever have escaped our observation: and how many kinds of these invisibles there may be, is still unknown; as they are discerned of all sizes, from those which are barely invisible to the naked eye, to such as resist the action of the microscope, as the fixed stars do that of the telescope, and with the best magnifiers hitherto invented appear only as so many moving points.

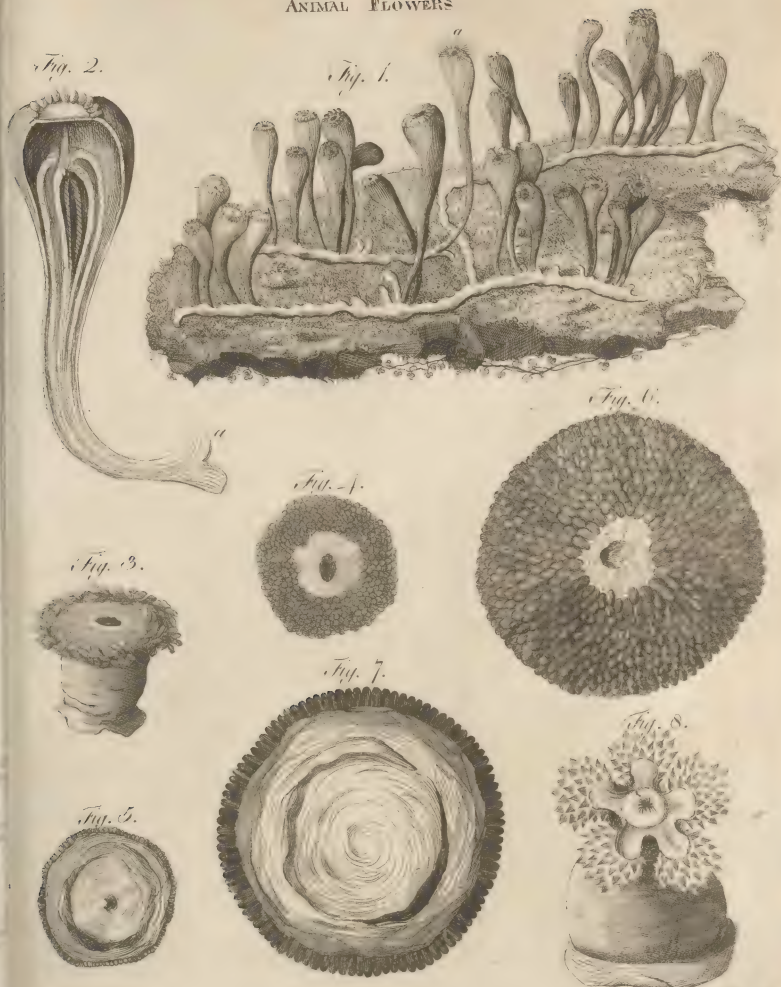
The smallest living creatures our instruments can shew are those that inhabit the waters: for though possibly animalcules equally minute, or perhaps more so, may fly in the air, or creep upon the earth, it is scarce possible to bring such under our examination; but water being transparent, and confining the creatures in it, we are able, by applying a drop of it to our glasses, to discover, to a certain degree of smallness, all that it contains.—Some of the most curious of these animalcules, which have been described by microscopical observers, we shall here give an account of.

1. *The Hair-like Insect*. This is so called by Mr Baker on account of its shape; being extremely slender, and frequently an hundred and fifty times as long as broad. The body or middle part, which is nearly straight, appears, in some, composed of such rings as the windpipe of land-animals is made up of; but in others, seems rather scaled, or made up of rings that obliquely cross one another. Its two ends are hooked or bent, pretty nearly in the same degree, but in a direction opposite to one another; and as no eyes can be discerned, it is difficult to judge which is the head or tail. Its progressive * motion is very singular, being performed by turning upon one end as a centre, and describing almost a quarter of a circle with the other, as represented in the figure. Its motions are very slow, and require much patience and attention in the observer. These creatures are so small, that millions of millions of them might be contained in an inch square. When viewed singly, they are exceedingly transparent, and of a beautiful green colour; but when numbers of them are brought together, they become opaque, lose their green colour, and grow entirely black.

Notwithstanding the extreme minuteness of these animalcules, they seem to be fond of society; for, after viewing for some time a parcel of them taken up at random,

Animal-
cul.Common-
acceptation
of the wordDifferent
sizes of animal-
cules.Hair-like
insect.* Pl. XXXII
(A) fig.4
Its extreme
smallness
&c.5
Delightful
society.

ANIMAL FLOWERS





Animal-
cule.

Plate XXIV

Fig. 2.

random, they will be seen disposing themselves in a kind of regular order. If a multitude of them are put into a jar of water, they will form themselves into a regular body, and ascend slowly to the top, where, after they have remained for some time exposed to the air, their green colour changes to a beautiful sky-blue. When they are weary of this situation, they form themselves into a kind of rope, which slowly descends as low as they intend; but if they happen to be close to the side of the jar, they will descend upon it. They are so nearly of the specific gravity of water itself, that they will either remain at the bottom, float on the surface, or be suspended in the middle, according as they are originally placed, or as they themselves have a mind.

Fig. 3.

6
seems pos-
sessed of a
considerable
degree of fac-
ility.7
Found in
prodigious
quantity.

A small quantity of the matter containing these animalcules \ddagger having been put into a jar of water, it so happened, that one part went down immediately to the bottom, whilst the other continued floating on the top. When things had remained for some time in this condition, each of these swarms of animalcules began to grow weary of its situation, and had a mind to change its quarters. Both armies, therefore, set out at the same time, the one proceeding upwards, and the other downwards; so that, after some hours journey, they met in the middle. A desire of knowing how they would behave on this occasion engaged the observer to watch them carefully; and to his surprise he saw the army that was marching upwards, open to the right and left, to make room for those that were descending. Thus, without confusion or intermixture, each held on its way; the army that was going up, marching in two columns to the top, and the other proceeding in one column to the bottom, as if each had been under the direction of wise leaders.

The hair-like insect was first discovered in a ditch at Norwich, one end of which communicates with the river there, and the other end with a second ditch into which several kennels empty themselves. The length of this ditch, when Mr Baker wrote his account of this animalcule, was at least 100 yards, and its breadth nine. The bottom, for more than a foot thick, was covered with a blackish green substance, in appearance like mud, made up for the most part of these insects; but, supposing only an half or a quarter part of it to be composed of them, according to the dimensions we have given, their numbers must exceed all imagination.

2. *Eels in paste, &c.* When paste is allowed to stand till it becomes four, it is then found to be the habitation of numberless animalcules, which may be discerned by the naked eye; and though their form cannot be perfectly distinguished, their motion is very perceptible, and the whole paste will seem to be animated.

8
Eels in paste
viviparous.

Fig. 4. represents one of these anguillæ magnified. The most remarkable property of these insects is, that they are viviparous. If one of them is cut thro' near the middle, several oval bodies of different sizes will be seen to issue forth. These are young anguillæ, each of them coiled up and inclosed in its proper membrane, which is so exquisitely fine, as scarce to be discernible by the greatest magnifier, while it incloses the embryo animal. The largest and most forward immediately break through this covering, unfold themselves, and wriggle about in the water nimbly; others get out, uncoil, and move themselves about more slowly; and the least mature continue entirely without motion. The uterus,

or vessel that contains all these oval bodies, is composed of many ringlets, not unlike the aspera arteria of land-animals, and seems to be considerably elastic; for as soon as the animalcule is cut in two, the oval bodies are thrust out with some degree of violence, from the springing-back or action of this bowel. An hundred and upwards of the young ones have been seen to issue from the body of one single eel, whereby the prodigious increase of them may be accounted for; as probably several such numerous generations are produced in a short time. They seem to be all prolific; and unless trial happens to be made upon one that has brought forth all its young, or when the paste has been kept for a very long time, the experiment will always succeed.—This property of these eels being viviparous, renders it highly improbable that they ever become flies.

Animalcules of a similar kind are likewise found in vinegar; and like those already described, are found to be viviparous. But it is not only in acid matters that such appearances are observed. In some fields of wheat, many grains may be observed, that appear blackish outwardly, as if scorched; but, when opened, are found to contain a soft white substance, which, attentively considered, appears to be nothing else than a congeries of threads or fibres lying close to each other in a parallel direction, much resembling the unripe down of some thistles on cutting open the flower-heads before they begin to blow. This fibrous matter discovers not the least sign of life or motion, unless water is applied; but immediately on wetting, provided the grains of wheat have been newly gathered, the supposed fibres separate, and appear to be living creatures. Their motions at first are very languid; but gradually become more vigorous, twisting and wriggling themselves somewhat in the manner of the eels in paste, but always slower than they, and with a great deal of less regularity.

If the grains of wheat are grown dry by keeping, and in that condition are cut open, the fibrous matter is very distinguishable; and, on putting water to it, will separate with great readiness, and seem like fine tubes or threads tapering at both ends: but not the least motion will be perceived till they have been in water for several hours, and sometimes they will never move at all. But if the same grains are steeped in water for three or four hours, or buried for some days in the earth till they are fully saturated with moisture, and then opened with a penknife, on taking out a small portion of the white matter carefully, and spreading it thin upon a slip of glass, the animalcules will be seen bunched together, and extended longitudinally, but without motion: and though, upon the application of water, they will not revive so soon as those taken from fresh grains, whose moisture has never been exhale; yet, after remaining an hour or two in water, they are constantly found alive and vigorous, even though the grains have been kept in a dry condition for several years.—It is necessary, however, to adapt, in some measure, the time of continuing the grains in water or earth to the age and dryness of them: for if they are not opened before they are too much softened, the animalcules will be dead; and unless the hulks are opened to let those creatures out after they have been steeped, they inevitably perish in them: otherwise, they will continue alive in water for many months; and, should the water dry away, may be revived again by giving them a fresh

K k k 2

supply

Animal-
cule.

Plate XXIV

(A)

9
Similar
creatures
found in
blighted
wheat.10
How dis-
tinctly
verbal.11
Precautions
necessary
in making
the
experiment.

Animal-
cule.

Plate XXIV
(A)

12
Proteus
why to call
ed.

13
Where
found.

14
Its shape,
colour, &c.

15
Its transfor-
mations.

16
Vorticella,
where found

supply.

3. *The Proteus*. This animalcule has been dignified by Mr Baker with the name of *Proteus*, on account of its assuming a great number of different shapes, so as scarce to be known as the same animal in its various transformations; and indeed unless it be carefully watched while passing from one shape to another, it will often become suddenly invisible, as happened more than once to Mr Baker.

When water, wherein any sort of vegetable has been infused, or animals preserved, has stood quietly for some days, or weeks, in any glass or other vessel, a slimy substance will be collected about the sides: some of which being taken up with the point of a penknife, placed on a slip of glass in a drop of water, and looked at through the microscope, will be found to harbour several kinds of little animals that are seldom found swimming about at large; among which the proteus is one. Its shape is better understood from the figure, than from any description that could be given. Its substance and colour seems to resemble that of a snail; and its whole shape seems to bear a considerable resemblance to that of a swan. It swims to and fro with great vivacity: but will now and then stop for a minute or two; during which time its long neck is usually employed as far as it can reach, forwards, and on every side, with a somewhat slow, but equable motion, like that of a snake, frequently extending thrice the length of its body, and seemingly in search of food.

There are no eyes, nor any opening in the head like a mouth, to be discerned: but its actions plainly prove it to be an animal that can fee; for though multitudes of different animalcules swim about in the same water, and its own progressive motion is very swift, it never strikes against any of them, but directs its course between them with a dexterity wholly unaccountable should we suppose it destitute of sight.

When the proteus is alarmed, it suddenly draws in its long neck, represented in fig. 5. and 6. transforming itself into the shape represented in fig. 7. when it becomes more opaque, and moves about very slowly with the large end foremost. When it has continued some time in this posture, it will often, instead of the head and neck it had formerly, put forth a new one, with a kind of wheel machinery, represented fig. 8. the motions of which draw a current of water to it from a considerable distance. Having often pulled in and thrust out this short head, sometimes with and sometimes without the wheel-work, the creature, as if weary, will remain motionless for a while; then its head and long neck will be very slowly protruded, as in fig. 9. and it soon resumes its former agility. Sometimes it disposes of its neck and head as represented in fig. 10.

4. *The Wheel-Animal, or Vorticella*. This wonderful animalcule is found in rain-water that has stood some days in leaden gutters, or in hollows of lead on the tops of houses; or in the slime or sediment left by such water; and perhaps may also be found in other places: but if the water standing in gutters of lead, or the sediment left behind it, has any thing of a red colour in it, one may be almost certain of finding them therein. Though it discovers no signs of life except when in the water, yet it is capable of continuing alive for many months after it is taken out of the water, and kept in a state as dry as dust. In this state it is of a glo-

bular shape, exceeds not the bigness of a grain of sand, and no signs of life appear: but, being put into water, in the space of half an hour, a languid motion begins; the globule turns itself about, lengthens itself by slow degrees, assumes the form of a lively maggot, and molt commonly in a few minutes afterwards puts out its wheels; swimming vigorously through the water, as if in search of food; or else, fixing itself by the tail, works the wheels in such a manner as to bring its food to it.

Fig. 23. and 24. shew the wheel-animal in its globular form; fig. 11. and 12. in its maggot state; and fig. 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22. shew the different appearances of its wheels, and also its various intermediate changes between the globular and maggot state.

The most remarkable part of this animalcule is its wheel-work. This consists of a couple of semicircular instruments, round the edges of which many little fibrillæ move themselves very briskly, sometimes with a kind of rotation, and sometimes in a trembling or vibrating manner. When in this state, it sometimes unfastens its tail, and swims along with a great deal of swiftness, seemingly in pursuit of its prey. Sometimes the wheels seem to be entire circles, armed with small teeth like those of the balance-wheel of a watch, appearing projected forwards beyond the head, and extending sideways somewhat wider than its diameter. The teeth or cogs of these wheels seem to stand very regularly at equal distances: but the figure of them varies according to their position, the degree of their protrusion, and perhaps the will of the animal itself. They appear sometimes like minute oblong squares, rising at right angles from the periphery of a circle, like ancient battlements on a round tower; at other times they terminate in sharp points, and all together resemble a kind of Gothic crown. They are often seen in a kind of curvular direction, all bending the same way, and seeming like so many hooks; and now and then the ends of them will be perceived to be clubbed like mallets. This figure, however, as well as the first, they assume but rarely.

As these wheels are every where excessively transparent, except about their circular rim or edge, where the cogs are set; it is very difficult to determine by what contrivance they are turned about, or what their real figure is, though they seem exactly to resemble wheels moving round upon an axis. It is also hardly possible to be certain whether those circular bodies in which the teeth are set, are of a flat form, or hollow and conical; but they seem rather to be of a conical figure. The difficulty of conceiving how an articulation could be contrived so as to cause a real rotation, hath caused many people imagine that there was a deception in this case: but Mr Baker assures us, that, when the wheels are fully protruded, they never fail to shew all the visible marks of a regular rotation; and, in some positions, the same cogs or teeth may be traced by the eye during a complete revolution.

All the actions of this creature seem to imply sagacity and quickness of sensation. At the least touch or motion in the water, they instantly draw in their wheels; and Mr Baker conjectures, that their eyes are lodged somewhere about the wheels: because, while in the maggot-state, its motions are slow and blundering; but after the wheels are protruded, they are performed with great

Animal-
cule.

Plate XXIV
(A)

17
Its wheel-
work describ-
ed.

18
Shew all the
marks of a
real rotation.

19
Shews great
quickness of
sensation.

Animal-
cule.
Plate XXIV
)

Fig. 15.
20
Description
its inter-
parts.

great regularity, swiftness, and steadiness.

Notwithstanding the minuteness of this animalcule, the microscope generally discovers others in the same drop of water, compared with which the wheel-animal may be said to be a whale. The transparency of its body, therefore, allows its internal parts to be seen, which cannot be perceived in the minutest animalcules on account of the smallness of their size. *a*, Is the appearance of the head; and, though it is every where transparent, a ring or circle more particularly remarkable for its clearness is commonly perceived about the middle of the forehead, a little above the mouth. This, Mr Baker thinks, might justly be called the seat of the brain. Many vessels which seem to take their origin from thence are discernible in the head, wherein some transparent fluid appears continually agitated by a kind of fluctuating motion.

The thorax, *b*, is joined to the head by a very short neck, *c*, and appears to be about the sixth part of the whole length of the animal. In the middle of the thorax is placed the heart, *d*, where its systole and diastole is plainly visible. It is seen through the back of the insect, shutting and opening alternately with great regularity and exactness. Its size is proportionable to the creature's bigness; and its shape, during the systole, is nearly circular, being composed seemingly of two femi-nular parts, which then approach each other laterally, and form between them a roundish or horse-shoe like figure, whose upper side is flat, and the under one convex. The diastole is performed by a seeming separation, or opening, of these two femi-nular parts, whereby the transverse diameter of the heart is very much enlarged. This separation begins exactly in the middle of the lower part next the tail; and opens to such a considerable width upwards, that the two parts, when at their utmost distention, seem only joined by an arched vessel at their anterior end. The alternate motions of contraction and dilatation are performed with great strength and vigour, in pretty much the same time as the pulsations of the arteries of a man in health. The motions of the heart are communicated to all the internal parts of the thorax; and seem to extend a great deal further; for a strict examination discovers, at the same time, throughout the whole animal, contractions and dilatations going on, that are apparently correspondent thereto. These motions of the heart, however, are sometimes suspended, or imperceptible, for two or three minutes; after which they are renewed, and go on again with the same regularity as before. From the under part of the thorax proceeds a small transparent horn represented at a fig. 11. and 12. It is never visible but when the animal turns on its back or side.

The blood or circulating fluid of the wheel-animal is so absolutely colourless, that the current of it through the vessels is indistinguishable by glasses. A sort of irregular agitation of some fluid is indeed perceived, which is perhaps a compound motion of currents running different ways, and forming such an appearance, tho' no single current is any where distinctly visible.

Immediately below the thorax is another annular division, *e*, joining upwards to the thorax, and downwards to the abdomen, the entrance whereof it serves occasionally to enlarge or diminish. The abdomen, *f*, is by much the largest part of the animal, and contains the stomach and intestines. When the insect is full of

food, these bowels appear opaque and of a blood-red colour, extending quite through the belly and great part of the tail, and exhibiting a variety of contractions and dilatations. The belly is capable of stretching out greatly in length, or being shortened very much, and widening its diameter. It assumes many shapes, and becomes occasionally a case for all the other parts of the body.

Besides the abovementioned one, there are found in the waters several other species of animals furnished with wheels, some of which appear to have a rotatory, and others a vibratory, motion. Fig. 25. represents a kind found in the ditch at Norwich, where the hair-like insect is produced. They differ from the foregoing only in having very long tails. Fig. 26, 27, and 28, represent a species of wheel-animals, which are also covered with shells. The body of this species consists of three parts, in like manner as the other; only the thorax and abdomen, in this, are not separated by any gut, or intermediate vessel, but are joined immediately together. The heart is plainly perceived, having a regular systole and diastole, at *a*, as in the former species. These creatures occasionally draw themselves entirely within their shells; and the shell then appears terminated by six short spikes on one side, and two on the other.

The young ones of this species are carried in oval sacculi, or integuments, fastened externally to the lower part of their shells somewhere about the tail: these sacculi are sometimes opaque only at one end, and seemingly empty at the other; sometimes they appear opaque in the middle, with a transparency all round, as in fig. 26. When a young one is about to buril its integuments, the parent splits it greatly, by wagging its tail, and striking the oval bag, so that the young one's head becomes as it were forced into the water, though the tail cannot be so soon disengaged. In this condition the young one sets its wheels a-going, and exerts all its endeavours to free itself from its confinement. When it has got clear, it swims away, wagging its tail as the old one does, and leaving the integument adhering to the shell of the parent. The old one then uses a number of efforts to get rid of this incumbrance, striking against it with her tail, fixing the end of her tail upon it, and then darting her body forward; with several very odd motions not easy to be described. This kind of wheel-animals are great tormentors of the water-sca, *Pulex aquaticus arborescens*: of Swammerdam, that a figure is given from that author (Plate XXIV. B): fig. 2. shews the natural size of the flea; and fig. 1. shews it magnified, with some of the wheel-animals adhering to it. These insects are often found in great numbers in the same waters: and when that is the case, it is not uncommon to discover five or six of these crustaceous wheel-animals fastened by their tail to the shell or horns of the flea; causing it, seemingly, a vast deal of uneasiness; nor can they be driven away, or shaken off, by all the efforts the flea can use for that purpose.

5. *The Bell-flower Animal, or Plumed Polype*. These animalcules dwell in colonies together, from ten to fifteen, (seldom falling short of the former number, or exceeding the latter), in a slimy kind of mucilaginous or gelatinous case; which, out of the water, has no determined form, appearing like a little lump of slime;

Animal-
cule.
Plate XXIV
(A)

Fig. 21
Other kinds
of wheel-
animals.

Fig. 22
Manner of
producing
their young
ones.

Fig. 28. f.

Fig. 23
Infest the
*Pulex aqua-
tius*.

Fig. 24
Bell-flower
animal.

but,

Animal-
cule.Plate XXIV
(A)25
Where dis-
covered.

but, when expanded therein, has some resemblance to the figure of a bell with its mouth upwards; and is usually about half an inch long, and a quarter of an inch in diameter. These bells, or colonies, are to be found adhering to the large leaves of duckweed, and other aquatic plants. They may be most easily discovered by letting a quantity of water, with duckweed in it, stand quietly for three or four hours in glass-vessels in a window, or other place whence a strong light comes: for then, if any are about the duckweed, they will be found, on careful inspection, extending themselves out of their cases, and making an elegant appearance.

The bell, or case, which these animals inhabit, being very transparent, all the motions of its inhabitants may be discerned through it distinctly. It seems divided internally into several apartments, or rather to contain several smaller sacculi, each of which incloses one of these animals. The openings at the tops of these sacculi, are but just sufficient to admit the creature's head and a small part of its body to be thrust out beyond them, the rest remaining always in the case. It can, however, occasionally retire into its case altogether; and never fails to do so when alarmed by any sudden motion of the water, or of the vessel which contains it.

26
Motions of
the whole
colony.

Besides the particular and separate motion which each of these creatures is able to exert within its own case, and independent of the rest; the whole colony together has a power of altering the position of the bell, or even of removing it from one place to another; and hence this bell is sometimes found standing perfectly upright, as in fig. 29 and 33, and sometimes bending the upper part downwards, as in fig. 30. As these animalcules seem not to chuse to stay together in societies whose number exceeds 15; when the colony happens to increase in number, the bell may be observed to split gradually, beginning from about the middle of the upper or anterior extremity, and proceeding downwards towards the bottom, as in fig. 32. till they at last separate intirely, and become two complete colonies independent of each other, one of which sometimes removes to another part of the vessel.

27
Description
of an individ-
ual.

The arms of each individual of this colony are set round the head, to the number of 40, having each the figure of an Italic *f*, one of whose hooked ends is fastened to the head; and all together, when expanded, compose a figure shaped somewhat like a horse's shoe, convex on the side next the body, but gradually opening and turning outwards, so as to leave a considerable area within the outer extremities of the arms. When the arms are thus extended, the creature, by giving them a vibrating motion, can produce a current in the water, which brings the animalcules, or whatever other minute bodies are within the sphere of its action, with great velocity to its mouth, situated between the arms; where they are taken in if liked, or driven away by a contrary motion. The food is conveyed immediately from the mouth or opening between the arms, through a narrow neck, into a passage seemingly correspondent to the oesophagus in land-animals; down which it passes into the stomach, where it remains for some time, and then is voided upwards, in small round pellets, thro' a gut whose exit is near the neck. The body consists of three divisions; in the uppermost of which are contained all the abovementioned intestines; which are only to

be discerned when the creature is full, at which time they become opaque. The other two divisions, which are probably fixed to the bell, seem to be of no other use than to give the creature a power of contraction and extension. The arms are not able to contract like those of the common polypi; but, when the animal retires into its case, they are brought together in a close and curious order, so as to be easily drawn in. Though their general appearance when expanded is that of a cup whose base and top are of an horse-shoe form, they sometimes separate into four parts, and range themselves as in fig. 36, so as to resemble four separate plumes of feathers. Tho' their eyes cannot be discovered, yet Mr Baker thinks they have some perception of the light: for, when kept in the dark, they always remain contracted; but, on being exposed to the light of the sun or of a candle, they constantly extend their arms, and shew evident signs of being pleased.

Fig. 29. represents one complete colony or bell standing erect, with all the animals out of their kingdom, and their arms extended, exhibiting all together a very pretty appearance. *a* represents two oval bodies, supposed by Mr Baker to be eggs.

Fig. 30. shews all the creatures withdrawn into their cells, and the end of the bell hanging downwards.

Fig. 33. shews the bell erect, with only one of the animals coming out, in order to show its connection with the bell.

Fig. 34. shews the head and arms of a single polype closing together, and disposing themselves in order to be drawn into the bell.

Fig. 35. shews one complete animal greatly magnified, to show its several parts more distinctly; viz. *a*, the head, resembling an horse-shoe; *bb*, the arms seen from one side; *c*, the narrow neck; *d*, the oesophagus; *e*, the stomach; *f*, the gut or last intestine thro' which the food passes after being digested in the stomach; *g*, the anus, where the feces are discharged in little pellets; *h i*, that part of the bell which surrounds the body of the animal, and closes upon it when it retires down.

Fig. 37. the head and arms seen in front.

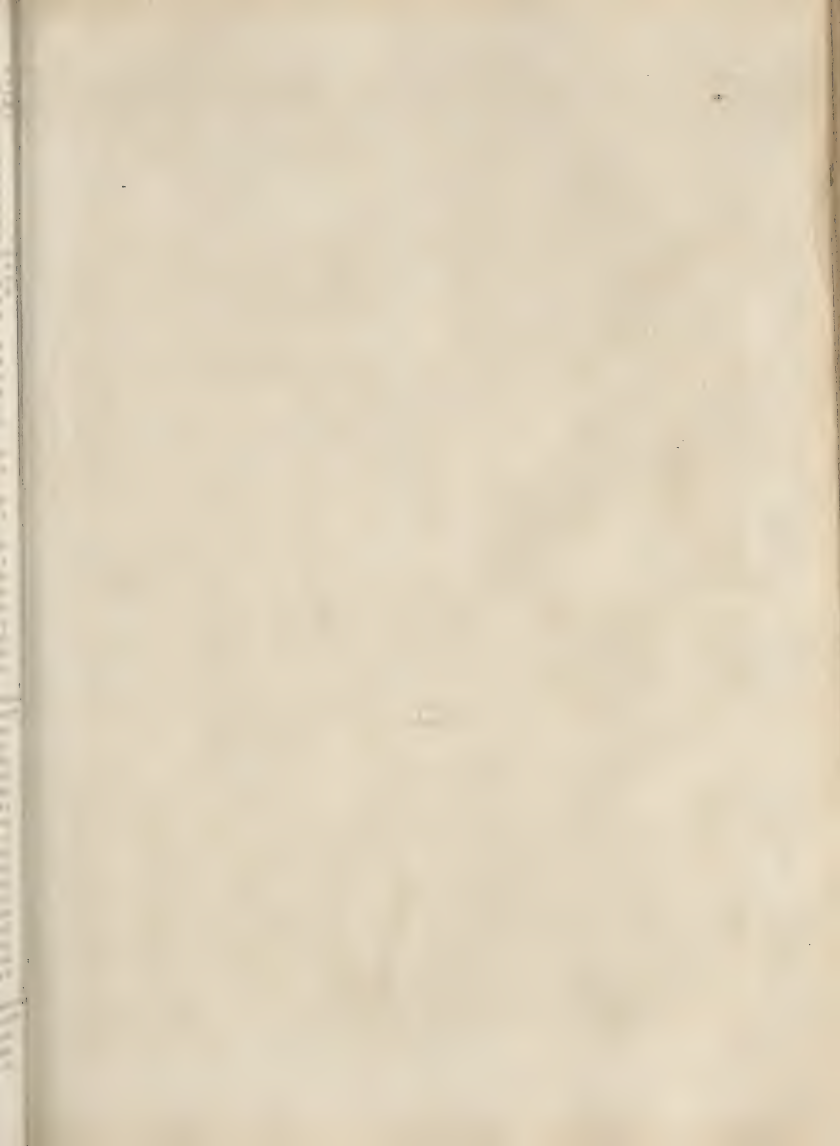
6. *The Globe-animal.* This animalcule, represented

fig. 38. seems exactly globular, having no appearance of either head, tail, or fins. It moves in all directions, forwards or backwards, up or down, either rolling over and over like a bowl, spinning horizontally like a top, or gliding along smoothly without turning itself at all. Sometimes its motions are slow, at other times very swift; and, when it pleases, it can turn round, as it were upon an axis, very nimbly, without removing out of its place. The whole body is transparent, except where the circular black spots are shewn in the figure. Some of the animals have no spots, and others from one to seven. The surface of the whole body appears, in some, as if all over dotted with points; in others, as if granulated like shagreen; but their more general appearance is, as if beset thinly round with short moveable hairs or bristles, which probably are the instruments by which their motions are performed. These animalcules may be seen by the naked eye, but appear only like moving points.

7. *The Pipe-animal.* These creatures are found on Pipe-a-the coast of Norfolk, living in small tubes or cases of sandy matter, in such multitudes as to compose a mass sometimes of three feet in length. Fig. 39. shews a

Animal-
cule.Plate XXI
(A)28
Seem to
have a per-
ception of
light.29
Globe animal.30
Pipe-a

piece.





31 animal-
cule. piece of such a congeries broke off, where *aaaa* represent the mouths or openings of the pipes wherein the little animals make their abode. Fig. 40. shews one single pipe, with its inhabitant, separated from the rest, and magnified nine or ten times in diameter. The pipe or case *b* is made of sand, intermixed here and there with minute shells, and all cemented together by a glutinous slime, probably issuing from the animal's own body *c*, which is composed of muscular ringlets like those of a worm, capable of great extension or contraction. The anterior end or head, *d*, is exceedingly beautiful, having round it a double row of little arms disposed in a very regular order, and probably capable of extension, in order to catch its food, and bring it to its mouth.—Some of these tubes are found petrified, and constitute one species of *fyringoides*.

32 8. *An Insect with net-like-arms.* The properties and shape of this little animal are very extraordinary. It is found only in cascades, where the water runs very swift. There these insects are found in clusters, standing erect on their tails; and resembling, when all together, the combs of bees at the time they are filled with their aurelia. On being taken out of the water, they spin threads, by which they hang exactly in the same manner as the garden-spider. Fig. 42. shews one of these insects magnified. Its body appears curiously turned as on a lathe; and at the tail are three sharp spines, on which it raises itself, and stands upright in the water: but the most curious apparatus is about its head, where it is furnished with two instruments like fans or nets, which serve to provide its food. These it frequently spreads out and draws in again; and when drawn up they are folded together with the utmost nicety and exactness, so as to be indistinguishable when brought close to the body. At the bottom of these fans a couple of claws are fastened to the lower part of the head, which, every time the nets are drawn in, conduct to the mouth of the animal whatever is taken in them. When the creature doth not employ its nets, it thrusts out a pair of sharp horns, as in fig. 41. where the insect is shewn magnified about 400 times.

33 Some of these creatures being kept with water in a vial, most of them died in two days; and the rest, having spun themselves transparent cases, (which were fastened either to the sides of the glass, or to pieces of grass put into it,) seemed to be changed into a kind of chrysalis: but before taking this form, they appeared as in fig. 43. which shape they likewise assumed when weary with catching their food, or when lying in wait for it. None of them lived above three days; and though fresh water was given them two or three times a-day, yet in a few hours it would sink to a degree scarce conceivable, and that too at several yards distance, though, in proportion to the water, all the included insects were not more than as 1 to 1,50,000. This makes it probable, that it is necessary for them to live in a rapid stream, lest they should be poisoned by the effluvia issuing from their own bodies, as no doubt they were in the vial.

34 9. *A curious aquatic worm.* This animalcule is shewn, magnified, at fig. 31. It is found in ditch-water; and is of various sizes, from $\frac{1}{10}$ to $\frac{1}{2}$ an inch in length. About the head it has somewhat of a yellowish colour; but all the rest of the body is perfectly colourless and transparent, except the intestines, which

are considerably opaque, and disposed as in the figure. Along its sides are several papillæ, with long hairs growing from them: it has two black eyes, and is very nimble. But the most remarkable thing in this creature, is a long horn or proboscis; which, in the large ones, may be seen with the naked eye, if the water is clear, and is sometimes $\frac{1}{2}$ of an inch in length: this it waves to and fro as it moves in the water, or creeps up the side of the glass; but it is not known whether it is hollow, or of what use it is to the creature itself.

10. *Spermatic Animals, and Animalcula Infusoria.* The discovery of living animalcules in the semen of most animals, is claimed by Mr Lewenhoeck and Mr Nicholas Hartsoeker; who both say, they published it about the end of the year 1677, or beginning of 1678: but Mr Lewenhoeck having given the most particular description of, and made by far the greatest number of experiments concerning them, the discovery is commonly attributed to him.

According to this naturalist, these animalcules are found in the semen masculinum of every kind of animal; but their general appearance is very much the same, nor doth their size differ in proportion to the bulk of the animal to which they belong. The bodies of all of them seem to be of an oblong oval form, with long tapering slender tails issuing from them; and as by this shape they resemble tadpoles, they have been frequently called by that name; tho' the tails of them, in proportion to their bodies, are much longer than the tails of tadpoles are: and it is observable, that the animalcules in the semen of fishes, have tails much longer and more slender, than the tails of those in other animals; inasmuch, that the extremity of them is not to be discerned without the best glasses, and the utmost attention. Fig. 21. N^o 1, 2, 3, 4, represent the spermatic animalcula of the rabbit; and N^o 5, 6, 7, 8, those of a dog; according to Mr Lewenhoeck.

The numbers of these animalcula are inconceivable. On viewing with a microscope, the milt, or semen masculinum of a living cod-fish, innumerable multitudes of animalcules were found therein, of such a diminutive size, that he supposed at least 10,000 of them capable of being contained in the bulk of a grain of sand; whence he concludes, that the milt of this single fish contained more living animalcules than there are to be found people living in the whole world. To find the comparative size of these animalcules, Mr Lewenhoeck placed an hair of his head near them; which hair, through his microscope, appeared an inch in breadth; and he was satisfied, that at least 60 such animalcules could easily lie within that diameter; whence, their bodies being spherical, it follows, that 216,000 of them are but equal to a globe whose diameter is the breadth of a hair. He observed, that, when the water wherewith he had diluted the semen of a cod-fish was exhaled, the little bodies of the animalcules burst in pieces; which did not happen to those in the semen of a ram: and this he imputes to the greater firmness and consistency of the latter, as the fish of a land-animal is more compact than fish.

These animalcules appear to be very vigorous, and tenacious of life; for they may be observed to move long after the animal from which they are taken is dead. They have this peculiarity also, that they are continually in motion, without the least rest or intermission, provided

Animal-
cule. Plate XXIV
(B)
35
Its horn or
proboscis.

36
Spermatic
animals,
when disco-
vered.

37
General ap-
pearance the
same in e-
very animal.

Plate XXIV
(B)

38
Inconceiv-
able num-
bers and mi-
nuteness.

39
Are conti-
nually in
motion.

Animal-
cule.Plate XXIV
(B)40
Animalcula
Infusoria.41
Mr Lewen-
hoek's ac-
count of a-
nimalcules
in rain-wa-
ter.42
Surprising
production
of these a-
nimalcules.43
Mr Ellis's
account of
animalcules
from infu-
sion of pota-
toes.

provided there is fluid sufficient for them to swim about in. These animalcula are peculiar to the semen; nothing that has the least token of life being discovered, by the best glasses, either in the blood, spitte, urine, gall, or chyle. Great numbers, however, are to be found in the whitish matter that flicks between the teeth; some of which are of an oval figure, and others resemble eels.

The *Animalcula Infusoria*, take their name from their being found in all kinds either of vegetable or animal infusions. Indeed, there is scarce any kind of water, unless impregnated with some mineral substance, but what will discover living creatures.—Mr Lewenhoek says, that at first he could discern no living creatures in rain-water; but after standing some days, he discovered innumerable animalcules, many thousands of times less than a grain of sand, and in proportion to a mite as a bee is to a horse.—In other rain-water, which had likewise stood some time, he found the smallest sort he had ever seen; and, in a few days more, met with others eight times as big as these, and almost round.—In another quantity of rain-water, that had been exposed like the former, he discovered a kind of animalcules with two little horns in continual motion. The space between the horns was flat, though the body was roundish, but tapering a little towards the end; where a tail appeared, four times as long as the body, and the thickness of a spider's web. He observed several hundreds of these within the space a grain of sand would occupy. If they happened on the least filament or string, they were entangled in it; and then would extend their bodies into an oblong round, and struggle hard to disengage their tails. He observed a second sort of an oval figure, and imagined the head to stand at the sharpest end. The body was flat, with several small feet moving exceedingly quick, but not discernible without a great deal of attention. Sometimes they changed their shape into a perfect round, especially when the water began to dry away. He met also with a third sort, twice as long as broad, and eight times smaller than the first: yet in these he discerned little feet, whereby they moved very nimbly. He perceived likewise a fourth sort, a thousand times smaller than a louse's eye, and which exceeded all the rest in briskness: he found these turning themselves round, as it were upon a point, with the celerity of a top. And he says, there were several other sorts.

The production of *animalcula infusoria* is very surprising. In four hours time, an infusion of cantharides has produced animalcula less than even the tails of the spermatic animals we have already described. Neither do they seem to be subject to the fate of other animals; but, several kinds of them at least, by dividing themselves in two, to enjoy a sort of immortality. Nor do the common methods by which other animals are destroyed, seem to be effectual for destroying their vital principle. Hot mutton-gravy, secured in a vial with a cork, and afterwards set among hot ashes to destroy as effectually as possible every living creature that could be supposed to exist in it, has nevertheless been found swarming with animalcules after standing a few days. In the Philosophical Transactions, Vol. LIX. we have the following curious account, given us by Mr Ellis, of animalcules produced from an infusion of potatoes of hempseed.

"On the 25th of May 1768, Fahrenheit's thermo-

meter 70°, I boiled a potatoe in the New-River water till it was reduced to a mealy consistence. I put part of it, with an equal proportion of the boiling liquor, into a cylindrical glass-vessel that held something less than half a wine-pint, and covered it close immediately with a glass-cover. At the same time, I sliced an unboiled potatoe; and, as near as I could judge, put the same quantity into a glass-vessel of the same kind; with the same proportion of New River water not boiled; and covered it with a glass cover; and placed both vessels close to each other.

"On the 26th of May, 24 hours afterwards, I examined a small drop of each, by the first magnifier of Wilson's microscope, whose focal distance is reckoned at $\frac{7}{8}$ th part of an inch; and, to my amazement, they were both full of animalcula of a linear shape, very distinguishable, moving to and fro with great celerity; so that there appeared to be more particles of animal than vegetable life in each drop.

"This experiment I have repeatedly tried, and always found it to succeed in proportion to the heat of the circumambient air; so that even in winter, if the liquors are kept properly warm, at least in two or three days the experiment will succeed.

"What I have observed are infinitely smaller than spermatic animals, and of a very different shape: the truth of which, every accurate observer will soon be convinced of, whose curiosity may lead him to compare them; and I am persuaded he will find they are no way akin.

"At present I shall pass over many other curious observations, which I have made on two years experiments, in order to proceed to the explaining a hint which I received last January from Mr De Saussure of Geneva, when he was here; which is, that he found one kind of these animalcula infusoria that increase by dividing across into nearly two equal parts.

"I had often seen this appearance in various species a year or two ago, as I found upon looking over the minutes I had taken when I made any new observation; but always supposed the animal, when in this state, to be in coition.

"Not hearing, till after M. De Saussure left this kingdom, from what infusion he had made his observation; his friend Dr de la Roche of Geneva informed me, the latter end of February last, that it was from hempseed.

"I immediately procured hempseed from different seeds-men in distant parts of the town. Some of it I put into New-River water, some into distilled water, and some I put into very hard pump water. The result was, that in proportion to the heat of the weather, or the warmth in which they were kept, there was an appearance of millions of minute animalcula in all the infusions; and, some time after, some oval ones made their appearance, as at fig. 3. *b c*. These were much larger than the first, which still continued; these wriggled to and fro in an undulatory motion; turning themselves round very quick all the time that they moved forwards. I was very attentive to see these animals divide themselves; and at last I perceived a few of the appearance of fig. 3. *a*, as it is represented by the first magnifier of Wilson's microscope; but I am so well convinced by experience, that they would separate, that I did not wait to see the operation: however, as the following sketches, which I have drawn from five other species, will very fully explain

Animal-
cule.Plate XXIV
(B)44
From an
infusion of
hempseed45
Divide
themselves
in two.

Animal-
cule.

Plate XXIV

(B)

plain this extraordinary phenomenon, there will be no difficulty in conceiving the manner of the first. See fig. 4, 5, 6, 7, 8.

"The proportion of the number of these animals which I have observed to divide in this manner, to the rest, is scarce 1 to 50; so that it appears rather to arise from hurts received by some few animalcula among the many, than to be the natural manner in which these kinds of animals multiply; especially if we consider the infinite quantity of young ones which are visible to us through the transparent skins of their bodies, and even the young ones that are visible in those young ones while in the body of the old ones.

"But nothing more plainly shews them to be zoophytes, than this circumstance, That when, by accident, the extremity of their bodies has been shrivelled for want of a supply of fresh water, the applying more fresh water has given motion to the part of the animal that was still alive; by which means, this shapeless figure has continued to live and swim to and fro all the time it was supplied with fresh water.

"I cannot finish this part of my remarks on these animals, without observing, that the excellent Linnaeus has joined the *beroe* with the *volvox*, one of the animalcula infusoria. The *beroe* is a marine animal, found on our coasts; of a gelatinous transparent nature, and of an oval or spherical form, about half an inch to an inch diameter; divided like a melon into longitudinal ribs, each of which is furnished with rows of minute fins; by means of which, this animal, like the animalcula infusoria, can swim in all directions with great swiftness. In the same manner I have seen most of those minute animals move so swift that we could not account for it, without supposing such a provision in nature, which is really true, but cannot be seen till the animals grow faint for want of water; then, if we attend, we may with good glasses plainly discover them.

"I have lately found out, by mere accident, a method to make their fins appear very distinctly, especially in the larger kind of animalcula, which are common to most vegetable infusions; such as the terebella. This has a longish body, with a cavity or groove at one end, like a gimlet: by applying, then, a small stalk of the horse-shoe geranium, (or geranium zonale of Linnaeus), fresh broken, to a drop of water in which these animalcula are swimming, we shall find that they will become torpid instantly; contracting themselves into an oblong oval shape, with their fins extended like so many bristles all round their bodies. The fins are in length about half the diameter of the middle of their bodies. Before I discovered this expedient, I tried to kill them by different kinds of salts and spirits; but though they were destroyed by this means, their fins were so contracted, that I could not distinguish them in the least. After lying in this state of torpidity for two or three minutes, if a drop of clean water is applied to them, they will recover their shape, and swim about immediately, rendering their fins again invisible."

Fig. 3, 4, 5, 6, 7, 8. represent different species of animalcula infusoria, mentioned by Mr Ellis as belonging to the genus of volvox of Linnaeus.

Fig. 3. represents the volvox ovalis, or egg-shaped volvox; at (b) and (c) it is expressed in its natural shape; at (a) the manner in which it becomes two ani-

Vol. I.

mals, by separating across the middle. This was found in the infusion of hempseed; but is found in other vegetable infusions, particularly that of tea-seed.

Fig. 4. is the volvox torquella, or wryneck. At (a) is represented its divided state; at (b) and (c) its natural state: this is common to most vegetable infusions, as is the following.

Fig. 5. is the volvox volutans, or the roller. At (a) the animal is separated, and becomes two distinct beings, each swimming about and providing for itself: this is often the prey of another species of this genus, especially while it is weak by this separation, not being so active for some time till it can recover itself. At (c) the animal appears to be hurt on one side; this impression in a little time is succeeded by another in the opposite side, as at (b), which soon occasions a division. At (d) is the side-view, and at (e) the front-view, of the natural shape of the animal.

Fig. 6. is the volvox oniscus, or wood-louse. At (a) is the natural shape of it, as it appears full of little hairs both at the head and tail; with those at the head, it whirls the water about to draw its prey to it; the feet, which are many, are very visible, but remarkably so in a side-view at (d). At (b) it is represented beginning to divide; and at (c) the animals are ready to part: in this state, as if in exquisite pain, they swim round and round, and to and fro, with uncommon velocity, violently agitated till they get asunder. This was found in an infusion of different kinds of pine-branches.

Fig. 7. is the volvox terebella, or the gimlet. This is one of the largest of the kind, and is very visible to the naked eye. It moves along swiftly, turning itself round as it swims, just as if boring its way. (a) and (b) are two views of its natural shape, (c) shews the manner of its dividing. When they are separated, the lower animal rolls very awkwardly along, till it gets a groove in the upper part. (d) represents one of them lying torpid, by means of the juice of the horse-shoe geranium, with its fins extended. This animal is found in many infusions, particularly of grass or corn.

Fig. 8. is the volvox vorax, or glutton. This animal was found in an infusion of the Tartarian pine; it varies its shape very much, contracting and extending its proboscis, turning it to and fro, in various directions, as at a, b, c, d, e. It opens its proboscis underneath the extremity, when it seizes its prey. The lesser active animals, that have lately been divided, such as those at fig. 3. (a), and at fig. 4. (a), serve it as food, when they come in its way: these it swallows down instantly, as it is represented at fig. 8. h and i. At (f) it is ready to divide, and at (g) it is divided; where the hinder part of the divided animal has got a proboscis or beak, to procure nourishment for itself, and soon becomes a distinct being from the fore part.

Thus we have given as full an account as our limits would admit, of the most curious kinds of animalcules that have hitherto been observed. We cannot, however, dismiss this subject, without taking notice of some of the most remarkable hypotheses which have been formed concerning their nature and origin.

Before the invention of microscopes, the doctrine of equivocal generation, both with regard to animals and equivocal plants of some kinds, was universally received: but this instrument soon convinced every intelligent person, that

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that

Animal-
cule.

Plate XXIV

(B)

46
Beroe described.47
Method of
discovering
the fins of
animalcules.

48

Doctrines of
equivocal
generation
exploded.

Animal-
cule.
Plate XXIV
(B)

that those plants which formerly were supposed to be produced by equivocal generation arose from seeds, and the animals, in like manner, from a male and female. But as the microscope threw light upon one part of nature, it left another involved in darkness; for the origin of the animalcula infusoria, or of the spermatc animals already mentioned, remains as yet as much unknown as that of many other kinds was when the doctrine of equivocal generation reigned in full force.

49
Supposed
discovery
concerning
generation.

The discovery of spermatc animalcules was thought to throw some light on the mysterious affair of generation itself, and these minute creatures were imagined to be each of them individuals of the same species with the parent. Here the infinite number of these animalcules was an objection, and the difficulty remained as great as before; for, as every one of these animalcules behaved to be produced from a male and female, to explain their origin by animalcular generation in the same manner, was only explaining generation by itself.

This hypothesis, therefore, having proved unsatisfactory, others have been invented. Mr Buffon, particularly, hath invented one, by which he at once annihilates the whole animalcular world; and in this he hath been followed by several very ingenious philosophers. For a particular account of this, so far as it concerns generation, we must refer to that article; but as he gives such a particular account of his having examined the human semen, that we cannot doubt of his accuracy, we shall here contrast his account with that of Mr Lewenhoeck already mentioned.

50
M. Buffon's
experiments
on the hu-
man semen.

Having procured the feminal vessels of a man who died a violent death, he extracted all the liquor from them while they were still warm; and having examined a drop of it with a double microscope, it had the appearance fig. 9. Large filaments appeared, which in some places spread out into branches, and in others intermingled with one another. These filaments clearly appeared to be agitated by an internal undulatory motion, like hollow tubes, which contained some moving substance. He saw distinctly this appearance changed for that fig. 10. Two of these filaments, which were joined longitudinally, gradually separated from each other in the middle, alternately approaching and receding, like two tense cords fixed by the ends, and drawn asunder in the middle. These filaments were composed of globules that touched one another, and resembled a chaplet of beads. After this, he observed the filaments swelled in several places, and perceived small globular bodies issue from the swelled parts, which had a vibratory motion like a pendulum. These small bodies were attached to the filaments by small threads, which gradually lengthened as the bodies moved. At last, the small bodies detached themselves entirely from the filaments, drawing after them the small thread, which looked like a tail. When a drop of the feminal liquor was diluted, these small bodies moved in all directions very briskly; and had he not seen them separate themselves from the filaments, he would, he says, have thought them to be animals. The feminal matter was at first too thick, but gradually became more fluid; and, in proportion as its fluidity increased, the filaments disappeared, but the small bodies became exceedingly numerous. Each of them had a long thread or tail attached to it, from which it evidently endeavoured to

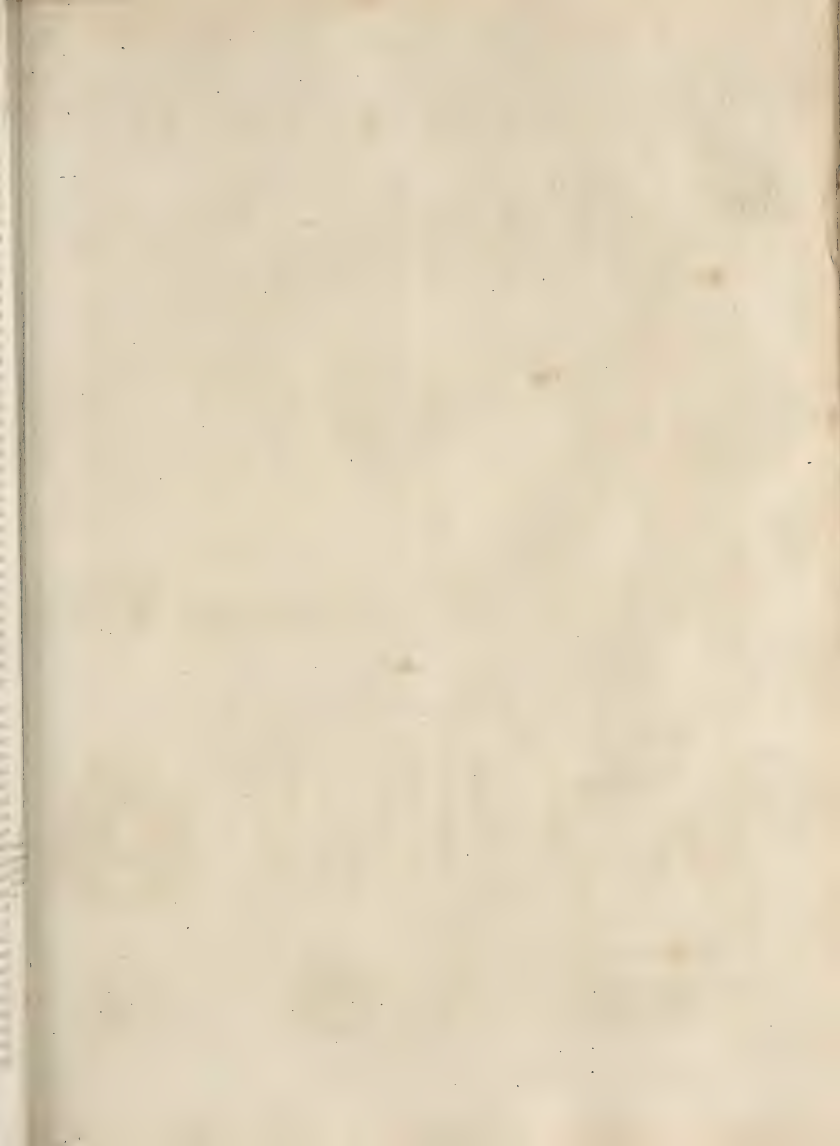
get free. Their progressive motion was extremely slow, during which they vibrated to the right and left, and at each vibration they had a rolling unsteady motion in a vertical direction.

At the end of two or three hours, the feminal matter becoming still more fluid, a greater number of these moving bodies appeared. They were then more free of incumbrances; their tails were shorter; their progressive motion was more direct, and their horizontal motion greatly diminished. In five or six hours, the liquor had acquired almost all the fluidity it could acquire, without being decomposed. Most of the small bodies were now disengaged from their threads; their figure was oval. They moved forward with considerable quickness, and, by their irregular motions backward and forward, they had now more than ever the appearance of animals. Those that had tails adhering to them, seemed to have less vivacity than the others; and of those that had no tails, some altered both their figure and their size. In twelve hours, the liquor had deposited at the bottom of the vial a kind of ash-coloured gelatinous substance, and the fluid at top was almost as transparent as water. The little bodies being now entirely freed from their threads, moved with great agility, and some of them turned round their centres. They also often changed their figures, from oval becoming round, and often breaking into smaller ones. Their activity always increased as their size diminished. In 24 hours, the liquor had deposited a greater quantity of gelatinous matter, which, being with some difficulty diluted in water, exhibited an appearance somewhat resembling lace. In the clear semen itself only a few small bodies were now seen moving; next day, these were still farther diminished; and after this nothing was to be seen but globules, without the least appearance of motion. Most of the above-mentioned appearances are shewn fig. 10, 11, 12, 13, 14, 15, 16. Figs. 17, and 18, represent an appearance of the globules in another experiment, in which they arranged themselves in troops, and passed very quickly over the field of the microscope. In this experiment they were found to proceed from a small quantity of gelatinous mucilage.

From these experiments, Mr Buffon concludes, that what have been called spermatc animals, are not creatures really endowed with life, but something proper to compose a living creature; and he distinguishes them by the name of *organic particles*. The same individual kinds of animals he declares he has found in the fluids separated from the ovaria of females; and for the truth of this appeals to the testimony of Mr Needham, who was an eye-witness of his experiments. He also brings an additional proof of his doctrine from Mr Needham's observations on the milt of the *calmar*, a species of cuttle-fish. Here the spermatc animals, at least what have the only appearance of life, are vastly larger than in any other creature, so as to be plainly visible to the naked eye. When magnified, they appear as at fig. 19, and 20. *a*. Their first appearance is at fig. 19. *a* and *b*, when they resemble springs inclosed in a transparent case. These springs were equally perfect at first as afterwards; only in time they contracted themselves, and became like a kind of screw. The head of the case is a species of valve which opens outward, and through which every thing within may be forced out. It contains, besides, another valve *b*, a little barrel *c*, and a spongy

Animal-
cule.
Plate XXIV
(B)

51
Needham's
experiments
on the milt
of the cal-
mar.





Animal-
cule.Plate XXIV
(B)
fig. 20.Animal-
cule.Plate XXIV
(B)

spongy substance *d. c.* Thus the whole machine consists of an outer transparent cartilaginous case *a*, the superior extremity of which is terminated by a round head formed by the case itself, and performs the office of a valve. This external case contains a transparent tube; which includes the spring, a piston or valve, a little barrel, and a spongy substance. The screw occupies the superior part of the tube and case, the piston and barrel are situated in the middle, and the spongy substance occupies the inferior part. These machines pump the liquor of the milt; the spongy substance is full of this liquor; and, before the animal spawns, the whole milt is only a congeries of these bodies which have sucked up all the liquor of it. Whenever these small machines are taken out of the body of the animal, and put in water, or exposed to the air, they begin to act, as represented fig. 19. and 20; the spring mounts up, and is followed by the piston, the barrel, and the spongy substance which contains the liquor: and, as soon as the spring and the tube in which it is contained begin to issue out of the case, the spring plait, and the whole internal apparatus moves, till the spring, the piston, and the barrel, have entirely escaped from the case. When this is effected, all the rest instantly follow, and the milky liquor which had been pumped in, and confined in the spongy substance, runs out through the barrel.

52
Conclusion
against the
existence of
animalcules.

According to this account, the milt of the calmar contains no animalcules; and therefore we may from analogy conclude, that the small moving bodies which are to be seen in the semen of other animals, are not really creatures endowed with life. Mr Buffon extends the analogy still further; and concludes, that all the moving bodies which are to be found in the infusions either of animal or vegetable substances are of a similar nature. "To discover, says he, whether all the parts of animals, and all the seeds of plants, contained moving organic particles, I made infusions of the flesh of different animals, and of the seeds of more than 20 different species of vegetables; and after remaining some days in close glasses, I had the pleasure of seeing organic moving particles in all of them. In some they appeared sooner, in others later; some preserved their motions for months, and others soon lost it. Some at first produced large moving globules resembling animals, which changed their figure, split, and became gradually smaller. Others produced only small globules, whose motions were extremely rapid; and others produced filaments, which grew longer, seemed to vegetate, and then swelled and poured forth torrents of moving globules."

53
Baron Munchan-
sen's
theory.

This last observation gave rise to a new system. Baron Munchansen, perceiving that the last mentioned moving globules, after moving for some time, began again to vegetate, concluded that they were first animals and then plants.—This strange hypothesis Mr Ellis has overturned in the paper already quoted; in which he asserts, that they are no other than the seeds of that genus of fungi called *mucor* or *mouldiness*, and that their motion is owing to numbers of minute animalcules attacking them for food. "Having (says he), at the request of Dr Linnæus, made several experiments on the infusion of mushrooms in water, in order to prove the theory of Baron Munchansen, that their seeds are first animals, and then plants, (which he takes notice of in his System of Nature, p. 1326, under the genus of

chaos, by the name of *chaos fungorum ferminum*) it appeared evidently, that the seeds were put into motion by very minute animalcules, which proceeded from the putrefaction of the mushroom: for, by pecking at these seeds, which are reddish, light, round bodies, they moved them about with great agility in a variety of directions; while the little animals themselves were scarce visible, till the food they had eaten had discovered them. The satisfaction I received from clearing up this point, led me into many other curious and interesting experiments.

"The ingenious Mr Needham supposes these little transparent ramified filaments, and jointed or coralloid bodies, which the microscope discovers to us on the surface of moist animal and vegetable infusions when they become putrid, to be zoophytes, or branched animals: but to me they appear, after a careful scrutiny with the best glasses, to be of that genus of fungi called *mucor*, or *mouldiness*; many of which Michelius has figured, and Linnæus has accurately described.

"Their vegetation is so amazingly quick, that they may be perceived in the microscope even to grow and feed under the eye of the observer.

"Mr Needham has pointed out to us a species that is very remarkable for its parts of fructification. (See Philosophical Transactions, vol. xlv. tab. 5. fig. 3. a, A.) This, he says, proceeded from an infusion of bruised wheat.

"I have seen the same species arise from the body of a dead fly, which was become putrid by lying floating for some time in a glass of water, where some flowers had been in the month of August, 1768. This species of *mucor* sends forth a mass of transparent filamentous roots; from whence arise hollow stems, that support little oblong oval feed-vessels, with a hole on the top of each. From these I could plainly fee minute globular seeds issue forth in great abundance with an elastic force, and turn about in the water as if they were animated.

"Continuing to view them with some attention, I could just discover, that the putrid water which surrounded them was full of the minutest animalcula; and that these little creatures began to attack the seeds of the *mucor* for food, as I have observed before in the experiment on the seeds of the larger kind of fungi or mushrooms. This new motion continued the appearance of their being alive for some time longer: but, soon after, many of them arose to the surface of the water, remaining there without motion; and a succession of them afterwards coming up, they united together in little thin masses, and floated to the edge of the water, remaining there quite inactive during the time of observation.

"As this discovery cleared up many doubts which I had received from reading Mr Needham's learned dissertation, I put into the glass several other dead flies, by which means this species of *mucor* was propagated so plentifully, as to give me an opportunity of frequently trying the same experiment to my full satisfaction.

"Lastly, These jointed coralloid bodies, which Mr Needham calls *chapllets* and *pearl necklaces*, I have seen frequently very distinctly. These appear not only on an infusion of bruised wheat when it becomes putrid, but on most other bodies when they throw up a viscid scum and are in a state putrefaction. These, then, are evidently no more than the most common *mucor*, the

54
Disproved
by Mr Ellis.

Animal-
cule.Plate XXIV
(B)

feeds of which are every where floating in the air; and bodies in this state afford them a natural proper foil to grow upon. Here they send downwards their fine transparent ramified roots into the moisture which they float upon; and from the upper part of the fecum, their jointed corallod branches rise full of feed into little grove-like figures. When a small portion of these branches and seeds are put into a drop of the same putrid water upon which the fecum floats, many of these millions of little animalcula with which it abounds, immediately seize them as food, and turn them about with a variety of motions, as in the experiments on the feeds of the common mushrooms, either singly, or two or three feeds connected together; answering exactly to Mr Needham's description, but evidently without any motion of their own, and consequently not animated."

85
M. Buffon's
opinion of
different
kinds of ani-
malcules.

Mr Buffon, however, is not content with denying life only to those beings where the signs of it are the most equivocal; but includes in the same rank of organic particles, almost every animal too small to be discovered by the naked eye, and even some of those whose motions are evidently perceptible to the eye. "Almost all microscopic animals," says he, "are of the same nature with the moving bodies in the femal fluids and infusions of animal and vegetable substances. The eels in paste, in vinegar, &c. are all of the same nature, and derived from the same origin. There are, perhaps, as many beings that either live or vegetate, produced by a fortuitous assemblage of organic particles, as by a constant and successive generation. Some of them, as those of the calmar, are only a kind of machines, which, though exceedingly simple, are very active. Others, as the spermatic animalcules, seem to imitate the movements of animals. Others resemble vegetables in their manner of growth and extension. There are others, as those of blighted wheat, which at pleasure can be made alternately either to live or die, and it is difficult to know to what they should be compared. There are still others, and in great numbers, which are at first a kind of animals, then become a species of vegetables, and again return alternately to their vegetable state. The eels in paste have no other origin than the union of the organic particles of the most essential part of the grain. The first eels that appear are certainly not produced by other eels; but tho' they are not propagated themselves, they fail not to engender other living eels. By cutting them with the point of a lancet, we discover smaller eels issuing in great numbers out of their bodies. The body of this animal seems to be only a sheath or sac, containing a multitude of smaller animals, which perhaps are other sheaths of the same kind, in which the organic matter is assimilated into the form of eels."

86
His reason-
ing incon-
clusive.

Though we can by no means pretend to account for the appearance of these animalcules, yet we cannot help observing, that our ignorance of the cause of any phenomenon is no argument against its existence. Though we are not able to account in a satisfactory manner for the origin of the native Americans, we suppose Mr Buffon himself would reckon it absurd to maintain that the Spaniards on their arrival there found only *organic particles* moving about in disorder. The case is the very same with the eels in paste. They are exceedingly minute in comparison with us; but, with the solar microscope, Mr Baker has made them assume a more respectable appearance, so as to have a diameter of an

inch and an half, or two inches, and a length proportionable. They swam up and down very briskly; the motion of their intestines was plainly visible; when the water dried up, they died with apparent agonies, and their mouths gaped very wide. Were we to find a creature of the size of this magnified eel, gasping in a place where water had lately been, we certainly would never conclude it to be an *organic particle*, or a fortuitous assemblage of them; but a fish. Why then should we conclude otherwise with regard to the eel while in its natural state, than that it is a little fish? In reasoning on this subject, we ought always to remember, that, however essential the distinction of bodies into great and small may appear to us, they are not so to the Deity; with whom, as Mr Baker well expresses himself, "an atom is as a world, and a world but as an atom."—Were the Deity to exert his power for a little, and give a natural philosopher a view of a quantity of paste filled with eels, from each of whose bodies the light was reflected as when it passes through a solar microscope; instead of imagining them organic particles, the paste would appear like a little mountain, he would probably look upon the whole as a monstrous assemblage of serpents, and be afraid to come near them. Wherever, therefore, we discover beings to appearance endowed with the principle of self-preservation, or whatever else we make the characteristic of animals, neither the smallness of their size, nor the impossibility of our knowing how they come there, ought to cause us doubt of their being really animated.—At the same time, it must also be remembered, that *motion* is not always a characteristic of animal life, even though the moving bodies should avoid one another, or any seeming obstacle placed in their way. We know, that inanimate bodies, when electrified, will avoid others endowed with an electricity of the same kind, and adhere to those which have the opposite one. As we are by no means acquainted with the utmost powers of electricity, but on the contrary, from what we do know of it have all the reason in the world to conclude that it can produce effects utterly beyond our comprehension, it is impossible for us to know what share it may have in producing the motions observed in vegetable-infusions, or in the semen of animals.—We may also further observe, that though in Mr Ellis's experiment of the boiled potatoe he took it for granted that every seed of animal life would be destroyed by the boiling water, yet even this cannot be proved; nay, on the contrary, it hath been proved by undeniable experiments, that the human body itself hath endured a heat of 240 degrees of Fahrenheit (28 degrees above that of boiling water) without injury. The eggs of these animalcula might therefore be strong enough to resist the heat hitherto used in Mr Ellis's or any other experiment.

A considerable objection to the existence of animalcules in the semen, or any other part of animal bodies, must arise from the total exclusion of air, which is found so necessary to the life of larger animals. Some instances, however, have been observed of large animals being found in such situations as they could not possibly have enjoyed the least benefit from the air for a great number of years; and in this state they have not only lived, but lived much longer than they would otherwise have done.

Animal-
cule.Plate XXIV
(B)

87
Animals
sometimes
found living
in solid bod-
ies.

Animal-
cule.

In Toulon harbour, and the road, are found solid hard stones, and perfectly entire; containing, in different cells, secluded from all communication with the air, several living shell-fish, of an exquisite taste, called *Dactylis*, i. e. Dates: to come at these fish, the stones are broken with man's. Also, along the coast of Anconia, in the Adriatic, are stones usually weighing about 50 pounds, and sometimes even more; the outside rugged, and easily broken, but the inside so hard, as to require a strong arm and an iron maul to break them: within them, and in separate niches, are found small shell-fish, quite alive, and very palatable, called *Solemes* or *Cappe lunghe*. These facts are attested by Gassendi, Blondel, Mayol, the learned bishop of Sulturnara, and more particularly by Aldrovandi a physician of Bologna. The two latter speak of it as a common fact, which they themselves saw.

In the volume for 1719, of the Academy of Sciences at Paris, is the following passage.

"In the foot of an elm, of the bigness of a pretty corpulent man, three or four feet above the root, and exactly in the centre, has been found a live toad, middle-sized, but lean, and filling up the whole vacant space: no sooner was a passage opened, by splitting the wood, than it scuttled away very hastily: a more firm and found elm never grew; so that the toad cannot be supposed to have got into it. The egg whence it was formed, mult, by some very singular accident, have been lodged in the tree at its first growth. There the creature had lived without air, feeding on the substance of the tree, and growing only as the tree grew. This is attested by Mr Hubert, professor of philosophy at Caen."

The volume for the year 1731 has a similar observation, expressed in these words.

"In 1719 we gave an account of a fact, which, tho' improbable, was well attested; that a toad had been found living and growing in the stem of a middling elm, without any way for the creature to come out or to have got in. M. Seigne, of Nantes, lays before the academy a fact just of the very same nature, except that, instead of an elm, it was an oak, and larger than the elm, which still heightens the wonder. He judges, by the time requisite for the growth of the oak, that the toad must have subsisted in it, without air, or any adventurous aliment, during 80 or 100 years. M. Seigne seems to have known nothing of the fact in 1719."

With the two foregoing may be classed a narrative of Ambrose Paré chief surgeon to Henry III. king of France, who, being a very sensible writer, relates the following fact, of which he was an eye-witness.

"Being (says he) at my seat, near the village of Meudon, and over-looking a quarry-man whom I had set to break some very large and hard stones; in the middle of one we found a huge toad, full of life, and without any visible aperture by which it could get there. I began to wonder how it received birth, had grown and lived; but the labourer told me, it was not the first time he had met with a toad, and the like creatures, within huge blocks of stone, and no visible opening or fissure."

Observations of living toads, found in very hard and entire stones, occur in several authors, particularly Baptist Fulgosa doge of Genoa, the famous physicians Agricola and Horstius, and lord Verulam: others

give very specious account of snakes, frogs, crabs, and lobsters, being found alive, inclosed within blocks of marble, rocks, and large stones.

An instance similar to these, of the truth of which we have no reason to doubt, was observed in this country in the year 1773, where a large toad was found in the middle of a piece of coal having not the least visible crack or fissure.

Upon the whole, therefore, though philosophers are not yet able to discover how these minute creatures are produced; yet, that there really are animals much smaller than what we can discern with our naked eye, seems to be indisputable. The subject, however, is still evidently obscure, and will no doubt require the utmost attention of philosophers, as well as further improvements in the construction of microscopes, fully to investigate it.

ANIMATED, or ANIMATE, in a general sense, denotes something endowed with animal-life. It also imports a thing to be impregnated with vermin or animalcules.

ANIMATED *Horse-hairs*. See HORSE-HAIRS.

ANIMATION signifies the informing an animal body with a soul: see the articles CREATION and SOUL. —The different hypothesis of physicians and philosophers, concerning the time of animation, have had their influence on the penal laws made against artificial abortions; it having been made capital to procure miscarriage in the one state, while in the other it was only deemed a venial crime. The emperor Charles V. by a constitution published in 1532, put the matter on another footing; instead of the distinction of an animated and unanimated fetus, he introduced that of a vital and non-vital fetus, as a thing of more obvious and easy decision, and not depending on any system either of creation, tradition, or infusion. Accordingly a fetus is said, in a legal sense, to be animated, when it is perceived to stir in the womb; which usually happens about the middle of the term of gestation.

ANIME, in heraldry, a term used when the eyes of a rapacious creature are borne of a different tincture from the creature itself.

ANIME, a resin exuding from the trunk of a large American tree, called by Pilo *jetaiba*, by the Indians *courbaril*. This resin is of a transparent amber colour, a light agreeable smell, and little or no taste. It dissolves entirely, but not very readily, in rectified spirit of wine; the impurities, which are often in large quantity, remaining behind. The Brazilians are said to employ anime in fumigations for pains and aches proceeding from a cold cause: with us, it is rarely, if ever, made use of for any medicinal purposes.

ANIMETTA, among ecclesiastical writers, denotes the cloth wherewith the cup of the eucharist is covered.

ANINGA, in commerce, a root which grows in the Antilles islands, and is pretty much like the China plant. It is used by sugar-bakers, for refining the sugar.

ANJOU, a province and duchy of France, bounded on the east by Touraine, on the south by Poitou, on the west by Bretagne, and on the north by Maine. It is 70 miles in length, and in breadth 60. Through this province run five navigable rivers: the Loire, which divides it in two parts; the Vienne, the Toue, the Maienne, and the Sarte.

The air is temperate, and the country agreeably diversified.

Animal-
cule
Anjon.Plate XXIV
(B)The subject
still obscure.

Anlo
Annals.

verified with hills and meadows. There are 33 forests of oak-trees mixed with beech. The country produces white-wine, wheat, barley, rye, oats, pease, beans, flax, hemp, walnuts, and some chefnuts. In Lower Anjou they make cyder. There are fruit-trees of all kinds, and pasture proper for horses. The greatest riches of the province consist in cows, oxen, and sheep. There are several coal and iron mines; and yet there are but two forges in the whole province. There are quarries of marble and of slate; as well as quarries of white stone, proper for building, on the side of the river Loire. Here are also several saltpetre-works and some glass-houses. The remarkable towns, besides Angers the capital, are Saumur, Brissac, Pons de Cea, La Fleche, and Beaufort.

ANIO, (Cicero, Horace, Priscian); ANIEN, (Statius); now *il Teverone*: a river of Italy, which falls into the Tiber, three miles to the north of Rome, not far from Antemne. It rises in a mountain near Treba, (Pliny); and, running through the country of the *Æquiculi*, or *Æqui*, it afterwards separated the Latins from the Sabines; but nearer its mouth, or confluence, it had the Sabines on each side. It forms three beautiful lakes in its course, (Pliny). In the territories of Tibur it falls from a great height, and there forms a very rapid cataract; hence the epithet *præceps*, and hence the steam caused by its fall, (Horace). *Anienus* is the epithet formed from it, (Virgil, Propertius): *Anienus* is also the god of the river, (Propertius, Statius).

ANISUM, or ANISE. See PIMPINELLA.

ANKER, a liquid measure at Amsterdam. It contains about 32 gallons English measure.

ANKLE, in anatomy, the joint which joins the foot to the leg.—We have an account of the menfes being regularly evacuated at an ulcer of the ankle, *Edin. Med. Obs.* vol. iii. art. 29.

ANN, or ANNAT, in Scots law, is half a year's stipend, which the law gives to the executors of ministers of the church of Scotland, over and above what was due to the minister himself, for his incumbency.

ANNA, a town of Turkey, in Asia, seated on the western bank of the river Euphrates. It is the pleasantest place in all these parts; for there is plenty of olives, oranges, citrons, lemons, pomegranates, and dates. Of these last there are prodigious quantities, and there are two forts not common elsewhere. The fields are sown with cotton, and the corn grows extremely high. The town is divided into two parts, the largest of which is surrounded with old walls; and the houses are built with brick and stone, with gardens belonging to them. E. Long. 41. 35. N. Lat. 33. 30.

ANNALE, in the church of Rome, a term applied to the masses celebrated for the dead during a whole year.

ANNALS, in matters of literature, a species of history, which relates events in the chronological order wherein they happened. They differ from perfect history in this, that annals are but a bare relation of what passes every year, as a journal is of what passes every day; whereas history relates not only the transactions themselves, but also the causes, motives, and springs of actions. Annals require nothing but brevity; history demands ornament.—Cicero informs us of the origin of annals. To preserve the memory of events, the *Pontifex Maximus*, says he, wrote what passed each year,

and exposed it on tablets in his own house, where every one was at liberty to read: this they called *annales maximi*; and hence the writers who imitated this simple method of narrating facts were called *annalists*.

ANNAN, the capital of Annandale, a division of Dumfriesshire in Scotland; a small town, containing 400 or 500 inhabitants, and situated on a river of the same name, in W. Long. 3°. N. Lat. 54. 40. This place has some trade in wine, and exports annually between 20 and 30,000 Winchester bushels, (10 and 15,000 bolls) of corn. Vessels of about 250 tons can come within half a mile of the town; and of 60, as high as the bridge; which consists of five arches, defended by a gateway. Here was formerly a castle; but it was demolished, by order of parliament, after the accession of James VI. to the crown of England, and at present only the ditches remain. The Bruces were once lords of this place, as appears by a stone taken from the ruins of the castle, with this inscription, “Robert de Brus Counte de Carrick et seigneur du val de Annand. 1300.” Annan was ruined in the time of Edward VI. at which time it was fortified against the English by a *Lyon* of the house of Glamis; but Lord Wharton, president of the marches, took the town, burnt it, and overthrew the church.

ANNANO, a strong fort of Italy, in the duchy of Milan. It has been twice taken by the French; but was restored to the duke of Savoy in 1706. It is seated on the river Tanaro, in E. Long. 8. 30. N. Lat. 44. 40.

ANNAPOLIS, the chief town in Maryland, in North America, which as yet is but mean, because the people in this province chuse to live on their plantations, as in Virginia. St Mary's was once the capital of the province of Maryland, and the town of Annapolis was known by the name of *Severn*. It received its present name in 1694, when it was made a port-town, and the residence of a collector and naval officer. The county court was removed thither in 1699, and ever since it has been the chief seat of justice, and held to be the capital of the province. W. Long. 78. 10. N. Lat. 39. 25.

ANNAPOLIS ROYAL, the capital of Nova Scotia, is seated in the bay of Fundy, and has a fine harbour; but there is a difficulty in entering in and coming out, and it is subject to fogs. The town is but small; and yet there are some handsome buildings, though the generality are but two stories high. It is defended by new and regular fortifications, and batteries of guns towards the sea. At the bottom of the harbour is a point of land, which divides two rivers; and on each side there are pleasant meadows, which in spring and autumn are covered with all sorts of fresh-water fowl. There is a trade carried on by the Indians with furs, which they exchange for European goods. A governor resides here, with a British garrison. W. Long. 64. 5. N. Lat. 45. 10.

ANNATES, among ecclesiastical writers, a year's income of a spiritual living.

These were, in ancient times, given to the Pope through all Christendom, upon the decease of any bishop, abbot, or parish-clerk, and were paid by his successor. At the Reformation they were taken from the Pope, and vested in the king; and, finally, Queen Anne restored them to the church, by appropriating them to the

Annan
Annates.

annealing the augmentation of poor livings.

ANNEALING, or **NEALING**, the burning or baking glass, earthen ware, &c. in an oven or furnace.

ANNEALING is more particularly used for the art of burning or fixing metalline colours on glass. See **GLASS**.

ANNE, Queen of Great Britain, daughter of James II. when duke of York, was born in 1664, and married to prince George of Denmark in 1683, by whom she had several children, but survived them all. Upon the death of William III. March 8, 1702, she succeeded to the throne, and to a war with France, which was prosecuted under her reign by the great duke of Marlborough, with more glory than profit to this nation. She effected the long wished-for union between England and Scotland, which took place May 1st, 1707; and dying August 1st, 1714, was succeeded by George Lewis Augustus elector of Hanover, as the direct descendant from James I. by his daughter Elizabeth queen of Bohemia.

St Anne's-Day, a festival of the Christian church, celebrated by the Latins on the 26th of July, but by the Greeks on the 5th of December. It is kept in honour of Anne, or Anna, mother of the Virgin Mary.

ANNECY, a city of Savoy, seated between Chambery and Geneva, on the banks of a lake of the same name, from whence run several brooks, which flow through the town, and uniting at length form a river. There are piazzas in most of the streets of the town, which serve to shelter the inhabitants from rain. It has several collegiate and parish churches, as well as convents for men and women. The lake is about nine miles long, and four broad. E. Long. 6. 12. N. Lat. 45. 53.

ANNESLEY (Arthur), earl of Anglesey, and lord privy seal in the reign of king Charles II. was the son of Sir Francis Annesley, Bart. lord Mount Norris, and viscount Valentia, in Ireland; and was born at Dublin on the tenth of July, 1614. He was for some time at the university of Oxford, and afterwards studied the law at Lincoln's Inn. He had a considerable share in the public transactions of the last century; for in the beginning of the civil war he sat in the parliament held at Oxford, but afterwards became reconciled to the opposite party, and was sent commissioner to Ulster, to oppose the designs of the rebel Owen Roe O'Neal. He engaged in several other affairs with great success. He was president of the council of state after the death of Oliver, and was principally concerned in bringing about the Restoration: soon after which, king Charles II. raised him to the dignity of a baron, by the title of lord Annesley, of Newport Pagnell, Bucks; and a short time after, he was made earl of Anglesey. During that reign he was employed in some very important affairs, was made treasurer of the navy, and afterwards lord privy-seal. In October 1680, his lordship was charged by one Dangerfield, in an information delivered upon oath, at the bar of the house of commons, with endeavouring to raise evidence in relation to the Popish plot, and to promote the belief of a Presbyterian one. The uneasiness he received from this attack did not prevent his speaking his opinion freely of those matters in the house of lords, particularly in regard to the Popish plot. About the same time he answered the lord Castlereven's Memoirs, in which that nobleman endeavoured to paint the Irish rebellion in the lightest colours; and a sharp dispute was raised, which

ended in the seals being taken from him. He was a person of great abilities, had uncommon learning, and was well acquainted with the constitution and laws of England. He wrote, besides his Animadversions on Castlereven's Memoirs, 1. The privileges of the House of Lords and Commons stated. 2. A discourse on the House of Lords. 3. Memoirs. 4. The history of the troubles in Ireland, from the rebellion in 1641, till the restoration. 5. Truth Unveiled, in behalf of the Church of England;—and some other works. He died in April 1686, in the 73^d year of his age; and was succeeded by his son James.

ANNEXATION, in law, a term used to imply the uniting of lands or rents to the crown.

ANNIHILATION, the act of reducing any created being into nothing.

Christians, Heathens, Jews, Siamese, Persians, divines, philosophers, &c. have their peculiar systems, sentiments, conjectures, not to say dreams, concerning annihilation; and we find great disputes among them about the reality, the possibility, the means, measures, prevention, ends, &c. of annihilation.

The first notions of the production of a thing from, or reduction of it to, nothing, Dr Burnet shews, arose from the Christian theology; the words *creation* and *annihilation*, in the sense now given to them, having been equally unknown to the Hebrews, the Greeks, and the Latins.

The ancient philosophers in effect denied all annihilation as well as creation, resolving all the changes in the world into new modifications, without supposing the production of any thing new, or destruction of the old. By daily experience, they saw compounds dissolved; and that in their dissolution nothing perished, but their union or connection of parts: when in death the body and soul were separated, the man they held was gone, but that the spirit remained in its original great soul of the world, and the body in its earth from whence it came; these were again wrought by nature into new compositions, and entered new states of being which had no relation to the former.

The Persian bramins hold, that, after a certain period of time, consisting of 71 joogs, God not only annihilates the whole universe, but every thing else, angels, souls, spirits, and all, by which he returns to the same state he was in before the creation; but that, having breathed a while, he goes to work again, and a new creation arises, to subvert 71 joogs more, and then to be annihilated in its turn. Thus they hold there have been almost an infinite number of worlds: but how many joogs are elapsed since the last creation, they cannot certainly tell; only in an almanac written in the Sanscrit language in 1670, the world is said to be then 3,892,771 years old from the last creation.

The Siamese heaven is exactly the hell of some Socinians, and other Christian writers; who, shocked with the horrible prospect of eternal torments, have taken refuge in the system of annihilation. This system seems countenanced by scripture; for that the words *death*, *destruction*, and *perishing*, whereby the punishment of the wicked is most frequently expressed in scripture, do most properly import annihilation and an utter end of being. To this Tillotson answers, that these words, as well as those corresponding to them in other languages, are often used, both in scripture and other writings,

Annexion
Annihilation.

Annihilation.

to signify a state of great misery and suffering, without the utter extinction of the miserable. Thus God is often said in scripture to bring *destruction* on a nation, when he sends judgments upon them, but without exterminating or making an end of them. So, in other languages, it is frequent, by *perishing*, to express a person's being made miserable; as in that known passage in Tiberius's letter to the Roman senate: *Ita me dii, deæque omnes, pejus perdant, quam hodie perire me sentio*. As to the word *death*, a state of misery which is as bad or worse than death may properly enough be called by that name; and thus the punishment of wicked men after the day of judgment is in the book of Revelations frequently called the *second death*.

Some Christian writers allow a long time of the most terrible torments of sinners; and after that suppose, that there shall be an utter end of their being. Of this opinion Irenæus appears to have been; who, according to M. du Pin, taught that the souls, at least of the wicked, would not subsist eternally; but that, after having undergone their torments for a certain period, they would at last cease to be at all. But Tillemont, Petit, Didier, and others, endeavour to defend Irenæus from this imputation, as being too favourable to the wicked.

It has been much disputed among divines, whether, at the consummation of all things, this *earth* is to be annihilated, or only purified, and fitted for the habitation of some new order of beings. Gerard in his common places, and Hakewill in his apology, contend earnestly for a total abolition or annihilation. Ray, Calmet, and others, think the system of renovation or restitution more probable, and more consonant to scripture, reason, and antiquity. The fathers who have treated on the question are divided; some holding that the universe shall not be annihilated, but only its external face changed; others asserting, that the substance of it shall be destroyed.

How widely have the sentiments of mankind differed as to the possibility and impossibility of annihilation? According to some, nothing so difficult; it requires the infinite power of the Creator to effect it: some go further, and seem to put it out of the power of God himself. According to others, nothing so easy: Existence is a state of violence; all things are continually endeavouring to return to their primitive nothing; it requires no power at all; it will do itself; nay, what is more, it requires an infinite power to prevent it.

Many authors consider preservation as a continual reproduction of a thing, which, subsisting no longer of itself, would every moment return into nothing. Gassendi on the contrary asserts, that the world may indeed be annihilated by the same power which first created it, but that to continue it there is no occasion for any power of preservation.

Some divines, of which number the learned bishop King seems to be, hold annihilation for the greatest of all evils, worse than even the utmost torments of hell-flames: while others, with some of the eastern philosophers, acknowledge annihilation for the ultimate pitch of happiness human nature is capable of; that sovereign good, that absolute beatitude, so long vainly sought for by the philosophers, is found here. No wonder it had been so long concealed; for who would have thought of looking for the *summum bonum*, where others have placed the sum of misery?

The said prelate proposes it as a question, whether suffering eternal torments be a greater evil than not existing? He thinks it highly probable, that the damned will be such fools, that, feeling their own misery in the most exquisite degree, they will rather applaud their own conduct, and chuse to be, and to be what they are, rather than not to be at all; fond of their condition, however wretched, like people enraged, they will persist in their former sentiments without opening their eyes to their folly, and persevere by way of indignation and revenge. Mr Bayle refutes him on this head; but might, one would think, have saved himself the trouble.

The Talapoins hold it the supreme degree of happiness to have the soul totally annihilated, and freed from the burden and slavery of transmigrations. They speak of three Talapoins, who, after a great number of transmigrations, became gods; and when arrived at this state, procured this further reward of their merit to be annihilated. The ultimate reward of the highest perfection man can arrive at is *niurepan*, or annihilation; which at length is granted to those who are perfectly pure and good, after their souls have wandered many thousand years through various bodies.

ANNI MUBILES, in law, denotes the marriageable age of a woman, viz. after she has arrived at twelve.

ANNIVERSARY, the annual return of any remarkable day. Anniversary days, in old times, more particularly denoted those days in which an office was yearly performed for the souls of the deceased, or the martyrdom of the saints was yearly celebrated in the church.

ANNOBON, a small island of Africa, on the coast of Loango, belonging to the Portuguese. It lies in E. Long. 5. 10. S. Lat. 1. 50. and receives its name from being discovered on New-year's day. According to Pyrad, it is about five or six French leagues in compass; but Bandrand says, it is ten leagues round. Here are two high mountains, the tops of which being continually covered with clouds, occasion frequent rains. On the south-east of the island are two rocks; one of which is low, and upon a level with the surface of the sea; the other higher and larger, but both dangerous in the night to shipping; but between them the channel is deep and clear. These rocks are inhabited by vast numbers of birds, so tame, that the sailors frequently catch them with their hands. On the same side of the island, is a convenient watering-place at the foot of a rivulet, which tumbles from the mountains down to a valley covered with orange and citron trees, &c. and affording a pleasant and refreshing shade; but the road on the north-west side is difficult and dangerous, though most frequented by ships who have no intention of touching upon the continent. In either place it is difficult to take in a sufficient quantity of water, on account of the violent breakings of the sea, and a stone intrenchment erected by the negroes, from which they annoy all strangers that attempt to land. The true road for shipping lies on the north-east side, where they may anchor in seven, ten, thirteen, or sixteen fathoms, on a fine sand cove to the land, opposite to the village where the negroes have thrown up their intrenchments.

The climate is wholesome, and the air clear and serene for the greatest part of the year. Every part of the island is watered by pleasant brooks, and fresh-water springs,

Annihilation.
Annoho

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Annona.

springs, which, however, at the new and full moons, or in all high tides, acquire a brackishness. The banks of every rivulet are covered with palms, whence the inhabitants extract their wine by incision. Here are a number of fertile valleys, which produce Turkey-corn, rice, millet, yams, potatoes, &c. and afford pasture for abundance of oxen, sheep, goats, &c. Poultry and fish also abound here; but the only mercantile production is cotton, which is esteemed equal in quality to any produced in India, though the quantity is small.

All the inhabitants are cleanly clothed; the women have only a piece of linen cloth wrapped under their stomach, and falling down in the form of a petticoat to the knees. They carry their children on their backs, and suckle them over the shoulder. The governor is a Portuguese, who has a few European servants about him: all the rest are natives, who pay him an implicit obedience, and are bigotted in their attachment to the Catholic religion; and provided they can pay their pater-noster, ave-maria, and confess themselves to the priest, they reckon themselves good Christians.

'ANNO DOMINI, i. e. the year of our Lord; the computation of time from our Saviour's incarnation.

ANOMINATION, in rhetoric, the same with what is otherwise called *paronomasia*. See PARONOMASIA.

ANNONA, in Roman antiquity, denotes provision for a year of all sorts, as of flesh, wine, &c. but especially of corn. Annona is likewise the allowance of oil, salt, bread, flesh, corn, wine, hay, and straw, which was annually provided by the contractors for the maintenance of an army.

ANNONA, the *Custard Apple*, a genus of the polygynia order, belonging to the polyandria class of plants. Of this genus there are eight

Species. 1. The reticulata, or custard-apple, is a native of the West-Indies, where it grows to the height of 25 feet, and is well furnished with branches on every side: the bark is smooth, and of an ash colour; the leaves are of a light green, oblong, and have several deep transverse ribs or veins, ending in acute points; the fruit is of a conical form, as large as a tennis-ball, of an orange colour when ripe, having a soft, sweet, yellowish pulp, of the consistence of a custard, from whence it has its name. 2. The muricatis, or four-top, rarely rises above 20 feet high, and is not so well furnished with branches as the other; the leaves are broader, have a smooth surface without any furrows, and are of a shining green colour: the fruit is large, of an oval shape, irregular, and pointed at the top, of a greenish yellow colour, and full of small knobs on the outside: the pulp is soft, white, and of a four and sweet taste intermixed, having many oblong, dark-coloured seeds. 3. The squamosa, or sweet top, seldom rises higher than 15 feet, and well furnished with branches on every side. The leaves have an agreeable scent when rubbed; the fruit is roundish and scaly, and when ripe turns of a purple colour, and hath a sweet pulp. 4. The palustris, or water-apple, grows to the height of 30 or 40 feet. The leaves are oblong, pointed, with some slender furrows, and have a strong scent when rubbed; the fruit is seldom eaten but by negroes. The tree grows in moist places in all the West India islands. 5. The cherimola, with oblong

scaly fruit, is a native of Peru, where it is much cultivated for the fruit, and grows to be a very large tree well furnished with branches. The leaves are of a bright green colour, and much larger than those of any of the other sorts. The fruit is oblong, and scaly on the outside, of a dark purple colour when ripe, and the flesh is soft and sweet, intermixed with many brown seeds which are smooth and shining. 6. The Africana, with smooth bluish fruit. 7. The Asiatica, or purple apple. This grows in some of the French islands, as also in Cuba, in great plenty. The trees rise to the height of 30 feet or more. The fruit is esteemed by the inhabitants of those islands, who frequently give them to sick persons. 8. The triloba, or North-American annona, called by the inhabitants *papaw*, is a native of the Bahama Islands, and likewise of Virginia and Carolina. The trunks of the trees are seldom bigger than the small of a man's leg, and are about 10 or 12 feet high, having a smooth greenish-brown bark. In March, when the leaves begin to sprout, the blossoms appear, consisting of six greenish-white petals. The fruit grows in clusters of three, and sometimes of four together: when ripe, they are yellow, covered with a thin smooth skin, which contains a yellow pulp of a sweet luscious taste. In the middle of this pulp, lie in two rows twelve seeds, divided by as many thin membranes. All parts of the tree have a rank, if not a fetid, smell; nor is the fruit relished by many except negroes. These trees grow in low shady swamps, and in a very fat soil.

Culture. The last sort will thrive in the open air in Britain, if it is placed in a warm and sheltered situation; but the plants should be trained up in pots, and sheltered in winter for two or three years till they have acquired strength. The seeds frequently remain a whole year in the ground; and therefore the earth in the pots ought not to be disturbed, though the plants do not come up the first year. If the pots where those plants are sown, are plunged into a new hot-bed, they will come up much sooner than those that are exposed to the open air. All the other sorts require to be kept in a warm stove, or they will not live in this country.

ANNONÆ PRÆFECTUS, in antiquity, an extraordinary magistrate, whose business it was to prevent a scarcity of provision, and to regulate the weight and fineness of bread.

ANNONAY, a small town of France, in the Upper Vivarais, seated on the river Deunre. E. Long. 4. 52. N. Lat. 45. 15.

ANNOT, a small city in the mountains of Provence in France. E. Long. 7. o. N. Lat. 44. 4.

ANNOTATION, in matters of literature, a brief commentary, or remark, upon a book or writing, in order to clear up some passage, or draw some conclusion from it.

ANNOTTO, in dyeing, an elegant red colour, formed from the pellicles of the seeds of a tree common in South-America. It is also called *orlean* and *roucou*. The manner of making annotto is as follows: The red seeds cleared from the pods, are steeped in water for seven or eight days or longer, till the liquor begins to ferment; then strongly stirred, stamped with wooden paddles and beaters, to promote the separation of the red skins: this process is repeated several times till the seeds are left white.

Annona.
|
Annotto.

Annotto,
Annuities
for a certain
time.

white. The liquor, passed through clove cane-sieves, is pretty thick, of a deep red colour, and a very ill smell; in boiling, it throws up its colouring matter to the surface in form of scum, which is afterwards boiled down by itself to a due consistence, and made up while soft into balls. The annotto commonly met with among us, is moderately hard and dry, of a brown colour on the outside, and a dull red within. It is difficultly acted upon by water, and tinges the liquor only of a pale brownish-yellow colour. In rectified spirit of wine, it very readily dissolves, and communicates a high orange or yellowish red. Hence it is used as an ingredient in varnishes, for giving more or less of an orange-cast to the simple yellows. Alkaline salts render it perfectly soluble in boiling water, without altering its colour. Wool or silk boiled in the solution, acquire a deep, but not a very durable, orange-dye. Its colour is not changed by alum or by acids, any more than by alkalies: but when imbibed in cloth, it is discharged by soap, and destroyed by exposure to the air. It is said to be an antidote to the poisonous juice of manioc or cassava.—Labat informs us, that the Indians prepare an annotto greatly superior to that which is brought to us, of a bright shining red colour, almost equal to carmine: that, for this purpose, instead of steeping and fermenting the seeds in water, they rub them with the hands, previously dipt in oil, till the pellicles come off, and are reduced into a clear paste;

which is scraped off from the hands with a knife, and laid on a clean leaf in the shade to dry. De Lact, in his notes on Margrave's natural history of Brazil, mentions also two kinds of annotto; one of a permanent crimson colour, used as a fucus or paint for the face; and another which gives a colour inclining more to that of fallron. This last, which is our annotto, he supposes to be a mixture of the first fort with certain resinous matters, and with the juice of the root of the tree.

ANNUAL, in a general sense, an appellation given to whatever returns every year, or is always performed within that space of time.

ANNUAL Motion of the Earth. See ASTRONOMY.

ANNUAL Leaves, are such leaves as come up afresh in the spring, and perish in winter. These stand opposed to Ever-greens.

ANNUAL Plants, called also simply annuals, are such as only live their year, i.e. come up in the spring and die again in the autumn; and accordingly are to be recruited every year.

ANNUALRENT, in Scots law, an yearly profit due by a debtor in a sum of money to a creditor for the use of it.

Right of ANNUALRENT, in Scots law, the original method of burdening lands with an yearly payment for the loan of money, before the taking of interest for money was allowed by statute.

Annual,
Annuities
for a certain
time.

A N N U I T I E S.

AN Annuity is a sum of money, payable yearly, half yearly, or quarterly, to continue a certain number of years, for ever, or for life.

An annuity is said to be an arrear, when it continues unpaid after it falls due. And an annuity is said to be in reversion, when the purchaser, upon paying the price, does not immediately enter upon possession; the annuity not commencing till some time after.

Interest on annuities may be computed either in the way of simple or compound interest. But compound interest, being found most equitable, both for buyer and seller, the computation by simple interest is universally diffused.

I. Annuities for a certain time.

PROBLEM I. Annuity, rate, and time, given, to find the amount, or sum of yearly payments, and interest.

RULE. Make 1 the first term of a geometrical series and the amount of 1 l. for a year the common ratio; continue this series to as many terms as their are years in the question; and the sum of this series is the amount of 1 l. annuity for the given years; which, multiplied by the given annuity, will produce the amount sought.

EXAMPLE. An annuity of 40 l. payable yearly, is forborn and unpaid till the end of 5 years; What will then be due, reckoning compound interest at 5 per cent. on all the payments then in arrear?

1 2 5 4 5
1 : 1.05 : 1.1025 : 1.157625 : 1.21550625? whose
sum is 5.52563125 l. ; and 5.25563125 × 40 =

221.02525=221 l. os. 6 d. the amount sought.

The amount may also be found thus: Multiply the given annuity by the amount of 1 l. for a year; to the product add the given annuity, and the sum is the amount in 2 years; which multiply by the amount of 1 l. for a year; to the product add the given annuity and the sum is the amount in 3 years, &c. The former question wrought in this manner follows.

40 am. in 1 year.	126.1 am. in 3 years.
1.05	1.05
—	—
42.00	132.405
40	40
—	—
82 am. in 2 years,	172.405 am. in 4 years.
1.05	1.05
—	—
86.10	181.02525
40	40
—	—

126.1 am. in 3 years. 221.02525 am. in 5 years.

If the given time be years and quarters, find the amount for the whole years, as above; then find the amount of 1 l. for the given quarters; by which multiply the amount for the whole years; and to the product add such a part of the annuity as the given quarters are of a year.

If the given annuity be payable half yearly, or quarterly, find the amount of 1 l. for half a year or a quarter; by which find the amount for the several half-years or quarters, in the same manner as the amount for the several years is found above.

PROB. 2.

Annuities
or a certain
time.

PROB. 2. Annuity, rate, and time given, to find the present worth, or sum of money that will purchase the annuity.

RULE. Find the amount of the given annuity by the former problem; and then, by compound interest, find the present worth of this amount, as a sum due at the end of the given time.

EXAMP. What is the present worth of an annuity of 40*l.* to continue 5 years, discounting at 5 per cent. compound interest?

By the former problem, the amount of the given annuity for 5 years, at 5 per cent. is 221.02525; and by compound interest, the amount of 1*l.* for 5 years, at 5*l.* per cent. is 1.2762815625

And, $1.2762815625 \times 221.02525000 = 173.179 = 173*l.* 3*s.* 7*d.*$ the present worth sought.

The present worth may be also found thus: By compound interest, find the present worth of each year by itself, and the sum of these is the present worth sought. The former example done in this way follows.

1.2762815625	40.00000000	(31.3410
1.21550625	40.00000000	(32.9080
1.157625	40.000000	(34.5353
1.1025	40.0000	(36.2811
1.05	40.0	(38.0952

Present worth, 173.1788

If the annuity to be purchased be in reversion, find first the present worth of the annuity, as commencing immediately, by any of the methods taught above; and then, by compound interest, find the present worth of that present worth, rebating for the time in reversion; and this last present worth is the answer.

EXAMP. What is the present worth of a yearly pension or rent of 75*l.* to continue 4 years, but not to commence till 3 years hence, discounting at 5 per cent.?

$.05 : 1 :: 75 : 1500$
 $1.05 \times 1.05 \times 1.05 \times 1.05 = 1.21550625$
 $1.21550625 \times 1500.00000 = 1234.05371$
 1500

265.94629, present worth of the annuity, if it was to commence immediately.

$1.05 \times 1.05 \times 1.05 = 1.157625$ *L. s. d.*
 $1.157625 \times 265.94629 = 229.7344 = 229*l.* 14*s.* 8*d.*$

PROB. 3. Present worth, rate and time given, to find the annuity.

RULE. By the preceding problem, find the present worth of 1*l.* annuity for the rate and time given; and then say, As the present worth thus found to 1*l.* annuity, so the present worth given to its annuity; that is, divide the given present worth by that of 1*l.* annuity.

EXAMP. What annuity, to continue 5 years, will 173*l.* 3*s.* 7*d.* purchase, allowing compound interest at 5 per cent.?

$.05 : 1 :: 1 : 201$
 $1.05 \times 1.05 \times 1.05 \times 1.05 \times 1.05 = 1.2762815625$
 $1.2762815625 \times 20.00000000 = 15.6705$
 20

15.6705.

4.3295 present worth of 1*l.* annuity.

4.329 173.179 (40*l.* annuity. *Ans.*

II. Annuities for ever, or freehold Estates.

IN freehold estates, commonly called *annuities in fee-simple*, the things chiefly to be considered are, 1. The annuity or yearly rent. 2. The price or present worth. 3. The rate of interest. The questions that usually occur on this head will fall under one or other of the following problems.

PROB. 1. Annuity and rate of interest given, to find the price.

As the rate of 1*l.* to 1*l.* so the rent to the price.

EXAMP. The yearly rent of a small estate is 40*l.*: What is it worth in ready money, computing interest at 3½ per cent.?

L. s. d.

As .035 : 1 : 40 : 1142.857142 = 1142*l.* 17*s.* 1½*d.*

PROB. 2. Price and rate of interest given, to find the rent or annuity.

As 1*l.* to its rate, so the price to the rent.

EXAMP. A gentleman purchases an estate for 4000*l.* and has 4½ per cent. for his money: Required the rent.

As 1 : .045 :: 4000 : 180*l.* rent sought.

PROB. 3. Price and rent given, to find the rate of interest.

As the price to the rent, so 1 to the rate.

EXAMP. An estate of 180*l.* yearly rent is bought for 4000*l.*: What rate of interest has the purchaser for his money?

As 4000 : 180 :: 1 : .045 rate sought.

PROB. 4. The rate of interest given, to find how many years purchase an estate is worth.

Divide 1 by the rate, and the quot is the number of years purchase the estate is worth.

EXAMP. A gentleman is willing to purchase an estate, provided he can have 2½ per cent. for his money: How many years purchase may he offer?

.025) 1.000 (40 years purchase. *Ans.*

PROB. 5. The number of years purchase, at which an estate is bought or sold, given, to find the rate of interest.

Divide 1 by the number of years purchase, and the quot is the rate of interest.

EXAMP. A gentleman gives 40 years purchase for an estate: What interest has he for his money?

40) 1.000 (.025 rate sought.

The computations hitherto are all performed by a single division or multiplication, and it will scarcely be perceived that the operations are conducted by the rules of compound interest; but when a reversion occurs, recourse must be had to tables of annuities on compound interest.

PROB. 6. The rate of interest, and the rent of a freehold estate in reversion, given, to find the present worth or value of the reversion.

By Prob. 1. find the price or present worth of the estate, as if possession was to commence presently; and then, by the Tables, find the present value of the given annuity, or rent, for the years prior to the commencement; subtract this value from the former value, and the remainder is the value of the reversion.

EXAMP. A has the possession of an estate of 130*l.* per annum, to continue 20 years; B has the reversion of the same estate from that time for ever: What is the

M m 2 value

Life Annuities.

value of the estate, what the value of the 20 years possession, and what the value of the reversion, reckoning compound interest at 6 per cent.?

By Prob. 1. .06)130.00)2166.0666 value of the estate.

By Tables 1491.0896 val. of the possession.

675.5770 val. of the reversion.

FROM 7. The price or value of a reversion, the time prior to the commencement, and rate of interest, given, to find the annuity or rent.

By the Tables, find the amount of the price of the reversion for the years prior to the commencement; and then by Prob. 3. find the annuity which that amount will purchase.

EXAMP. The reversion of a freehold estate, to commence 20 years-hence, is bought for 675.5771. compound interest being allowed at 6 per cent.: Required the annuity or rent.

By the Tables the amount of 675.5771. } *L.*
for 20 years, at 6 per cent. is } 2166.0

By Prob. 2. 2166.0X.06=130.0 rent sought.

III. Life Annuities.

THE value of annuities for life is determined from observations made on the bills of mortality. Dr Halley, Mr Simpson, and Monf. de Moivre, are gentlemen of distinguished merit in calculations of this kind.

Dr Halley had recourse to the bills of mortality at Breslaw, the capital of Silesia, as a proper standard for the other parts of Europe, being a place pretty central, at a distance from the sea, and not much crowded with traffickers or foreigners. He pitches upon 1000 persons all born in one year, and observes how many of these were alive every year, from their birth to the extinction of the last, and consequently how many died each year, as in the first of the following tables; which is well adapted to Europe in general. But in the city of London, there is observed to be a greater disparity in the births and burials than in any other place, owing probably to the vast resort of people thither, in the way of commerce, from all parts of the known world. Mr Simpson, therefore, in order to have a table particularly suited to this populous city, pitches upon 1280 persons all born in the same year, and records the number remaining alive each year, till none were in life.

It may not be improper, however, to observe, that however perfect tables of this sort may be in themselves, and however well adapted to any particular climate, yet the conclusions deduced from them must always be uncertain, being nothing more than probabilities, or conjectures drawn from the usual period of human life. And the practice of buying and selling annuities on lives, by rules founded on such principles, may be justly considered as a sort of lottery or chance-work, in which the parties concerned must often be deceived. But as estimates and computations of this kind are now become fashionable, we shall subjoin some brief account of such as appear most material.

Dr Halley's table on the bills of mortality at Breslaw. Life Annuities.

Age.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.
1	1000	24	573	47	377	70	142
2	855	25	567	48	367	71	131
3	798	26	560	49	357	72	120
4	760	27	553	50	346	73	109
5	732	28	546	51	335	74	98
6	710	29	439	52	324	75	88
7	692	30	531	53	313	76	78
8	680	31	523	54	302	77	68
9	670	32	515	55	292	78	58
10	661	33	507	56	282	79	49
11	653	34	499	57	272	80	41
12	646	35	490	58	262	81	34
13	640	36	481	59	252	82	28
14	634	37	472	60	242	83	23
15	628	38	463	61	232	84	20
16	622	39	454	62	222	85	15
17	616	40	445	63	212	86	11
18	610	41	436	64	202	87	8
19	604	42	427	65	192	88	5
20	598	43	417	66	182	89	3
21	592	44	407	67	172	90	1
22	586	45	397	68	162	91	0
23	579	46	387	69	152		

Mr Simpson's table on the bills of mortality at London.

Age.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.
0	1280	24	434	48	220	72	59
1	870	25	426	49	212	73	54
2	700	26	418	50	204	74	49
3	635	27	410	51	196	75	45
4	600	28	402	52	188	76	41
5	580	29	394	53	180	77	38
6	564	30	385	54	172	78	35
7	551	31	376	55	165	79	32
8	541	32	367	56	158	80	29
9	532	33	358	57	151	81	26
10	524	34	349	58	144	82	23
11	517	35	340	59	137	83	20
12	510	36	331	60	130	84	17
13	504	37	322	61	123	85	14
14	498	38	313	62	117	86	12
15	492	39	304	63	111	87	10
16	486	40	294	64	105	88	8
17	480	41	284	65	99	89	6
18	474	42	274	66	93	90	5
19	468	43	264	67	87	91	4
20	462	44	255	68	81	92	3
21	455	45	246	69	75	93	2
22	448	46	237	70	69	94	1
23	441	47	228	71	64	95	0

From the preceding tables the probability of the continuance or extinction of human life is estimated as follows.

1. The probability that a person of a given age shall live a certain number of years, is measured by the proportion which the number of persons living at the proposed age has to the difference between the said number

ber

Annuitant's age and the number of persons living at the given age.

Thus, if it be demanded, what chance a person of 40 years has to live seven years longer? from 445, the number of persons living at 40 years of age in Dr Halley's table, subtract 377, the number of persons living at 47 years of age, and the remainder 68, is the number of persons that died during these 7 years; and the probability or chance that the person in the question shall live these 7 years is as 377 to 68, or nearly as 5½ to 1. But, by Mr Simpson's table, the chance is something less than that of 4 to 1.

2. If the year to which a person of a given age has an equal chance of arriving before he dies, be required, it may be found thus: Find half the number of persons living at the given age in the tables, and in the column of age you have the year required.

Thus, if the question be put with respect to a person of 30 years of age, the number of that age in Dr Halley's table is 531, the half whereof is 265½, which is found in the table between 57 and 58 years; so that a person of 30 years has an equal chance of living between 27 and 28 years longer.

3. By the tables, the premium of insurance upon lives may in some measure be regulated.

Thus, the chance that a person of 25 years has to live another year, is, by Dr Halley's table, as 80 to 1; but the chance that a person of 50 years has to live a year longer is only 30 to 1. And, consequently, the premium for insuring the former ought to be to the premium for insuring the latter for one year, as 30 to 80, or as 3 to 8.

PROB. I. To find the value of an annuity of 1 l. for the life of a single person of any given age.

MONF. DE MOIRÉ, by observing the decrease of the probabilities of life, as exhibited in the table, composed an algebraic theorem or canon, for computing the value of an annuity for life; which canon we here lay down by way of

RULE. Find the complement of life; and, by the tables, find the value of 1 l. annuity for the years denoted by the said complement; multiply this value by the amount of 1 l. for a year, and divide the product by the complement of life; then subtract the quot from 1; divide the remainder by the interest of 1 l. for a year; and this last quot will be the value of the annuity sought, or, in other words, the number of years purchase the annuity is worth.

EXAMP. What is the value of an annuity of 1 l. for an age of 50 years, interest at 5 per cent.?

86

50 age given.

—

36 complement of life.

By the tables, the value is, 16.5468

Amount of 1 l. for a year, 1.05

827340

165468

Complement of life, 36)17.374140:482615

From unity, viz. 1.000000

Subtract .482615

Interest of 1 l. .05)5.17385(10.3477 value sought.

By the preceding problem is constructed the follow-

ing table.

The value of 1 l. annuity for a single life.

Age.	3 per c.	3½ per c.	4 per c.	4½ per c.	5 per c.	6 per c.
9=10	19.87	18.27	16.88	15.67	14.60	12.80
8=11	19.74	18.16	16.79	15.59	14.53	12.75
7=12	19.60	18.05	16.64	15.51	14.47	12.70
6=13	19.47	17.94	16.60	15.43	14.41	12.65
5=14	19.33	17.82	16.50	15.35	14.34	12.60
4=15	19.19	17.71	16.41	15.27	14.27	12.55
3=16	19.05	17.59	16.31	15.19	14.20	12.50
2=17	18.90	17.46	16.21	15.10	14.12	12.45
1=18	18.76	17.33	16.10	15.01	14.05	12.40
0=19	18.61	17.21	15.99	14.92	13.97	12.35
4=20	18.46	17.09	15.89	14.83	13.89	12.30
21	18.30	16.96	15.78	14.73	13.81	12.20
22	18.15	16.83	15.67	14.64	13.72	12.15
23	17.99	16.69	15.55	14.54	13.64	12.10
3=24	17.83	16.56	15.43	14.44	13.55	12.00
25	17.66	16.42	15.31	14.34	13.46	11.95
26	17.50	16.28	15.19	14.23	13.37	11.90
27	17.33	16.13	15.04	14.12	13.28	11.80
28	17.16	15.98	14.94	14.02	13.18	11.75
29	16.98	15.83	14.81	13.90	13.09	11.65
30	16.80	15.68	14.68	13.79	12.99	11.60
2=31	16.62	15.53	14.54	13.67	12.88	11.50
32	16.44	15.37	14.41	13.55	12.78	11.40
33	16.25	15.21	14.27	13.43	12.67	11.35
34	16.06	15.05	14.12	13.30	12.56	11.25
35	15.86	14.89	13.98	13.17	12.45	11.15
36	15.67	14.71	13.82	13.04	12.33	11.05
37	15.46	14.52	13.67	12.90	12.21	11.00
38	15.29	14.34	13.52	12.77	12.09	10.90
3=39	15.05	14.16	13.36	12.63	11.96	10.80
40	14.84	13.98	13.20	12.48	11.83	10.70
41	14.63	13.79	13.02	12.33	11.70	10.55
42	14.41	13.59	12.85	12.18	11.57	10.45
43	14.19	13.40	12.68	12.02	11.43	10.35
44	13.96	13.20	12.50	11.87	11.29	10.25
45	13.73	12.99	12.32	11.70	11.14	10.10
46	13.49	12.78	12.13	11.54	10.99	10.00
47	13.25	12.56	11.94	11.37	10.84	9.85
48	13.01	12.36	11.74	11.19	10.68	9.75
49	12.76	12.14	11.54	11.00	10.51	9.60
50	12.51	11.92	11.34	10.82	10.35	9.45
51	12.26	11.69	11.13	10.64	10.17	9.30
52	12.00	11.45	10.92	10.44	9.99	9.20
53	11.73	11.20	10.70	10.24	9.82	9.00
54	11.46	10.95	10.47	10.04	9.63	8.85
55	11.18	10.69	10.24	9.82	9.44	8.70
56	10.90	10.44	10.01	9.61	9.24	8.55
57	10.61	10.18	9.77	9.39	9.04	8.35
58	10.32	9.91	9.52	9.16	8.83	8.20
59	10.03	9.64	9.27	8.93	8.61	8.00
60	9.73	9.36	9.01	8.70	8.30	7.80

Life Annui-
ties.

The value of 1 l. annuity for a single life.

L.

Life Annui-
ties.

	3 per c.	3½ per c.	4 per c.	4½ per c.	5 per c.	6 per c.
61	9.42	9.08	8.75	8.44	8.16	7.60
62	9.11	8.79	8.48	8.19	7.93	7.40
63	8.79	8.49	8.20	7.94	7.68	7.20
64	8.46	8.19	7.92	7.67	7.43	6.95
65	8.13	7.88	7.63	7.39	7.18	6.75
66	7.79	7.56	7.33	7.12	6.91	6.50
67	7.45	7.24	7.02	6.83	6.64	6.25
68	7.10	6.91	6.75	6.54	6.36	6.00
69	6.75	6.57	6.39	6.23	6.07	5.75
70	6.38	6.22	6.06	5.92	5.77	5.50
71	6.01	5.87	5.72	5.59	5.47	5.20
72	5.63	5.51	5.38	5.26	5.15	4.90
73	5.25	5.14	5.02	4.92	4.82	4.60
74	4.85	4.77	4.66	4.57	4.49	4.30
75	4.45	4.38	4.29	4.22	4.14	4.00
76	4.05	3.98	3.91	3.84	3.78	3.65
77	3.63	3.57	3.52	3.47	3.41	3.30
78	3.21	3.16	3.11	3.07	3.03	2.95
79	2.78	2.74	2.70	2.67	2.64	2.55
80	2.34	2.31	2.28	2.26	2.23	2.15

The above table shews the value of an annuity of one pound for a single life, at all the current rates of interest; and is esteemed the best table of this kind extant, and preferable to any other of a different construction. But yet those who sell annuities have generally one and a half or two years more value, than specified in the table, from purchasers whose age is 20 years or upwards.

Annuities of this sort are commonly bought or sold at so many years purchase; and the value assigned in the table may be so reckoned. Thus the value of an annuity of one pound for an age of 50 years, at 3 per cent. interest, is 12.51; that is, 12 l. 10 s. or twelve and a half years purchase. The marginal figures on the left of the column of age serve to shorten the table, and signify, that the value of an annuity for the age denoted by them, is the same with the value of an annuity for the age denoted by the numbers before which they stand. Thus the value of an annuity for the age of 9 and 10 years is the same; and the value of an annuity for the age of 6 and 14, for the age of 3 and 24, &c. is the same. The further use of the table will appear in the questions and problems following.

QUEST. 1. A person of 50 years would purchase an annuity for life of 200 l.: What ready money ought he to pay, reckoning interest at 4½ per cent.?

L.

By the table the value of 1 l. is 10.8

Multiply by 200

Value to be paid in ready money 2164.00 Ans.

QUEST. 2. A young merchant marries a widow lady of 40 years of age, with a jointure of 300 l. a-year, and wants to dispose of the jointure for ready money: What sum ought he to receive, reckoning interest at 3½ per cent.?

By the table the value of 1 l. is 13.98

300

Value to be received in ready money 4194.00 Ans.
PROB. 2. To find the value of an annuity for the joint continuance of two lives, one life failing, the annuity to cease.

Here there are two cases, according as the ages of the two persons are equal or unequal.

1. If the two persons be of the same age, work by the following

RULE. Take the value of any one of the lives from the table; multiply this value by the interest of 1 l. for a year; subtract the product from 2; divide the foreaid value by the remainder; and the quot will be the value of 1 l. annuity, or the number of years purchase sought.

EXAMP. What is the value of 100 l. annuity for the joint lives of two persons, of the age of 30 years each, reckoning interest at 4 per cent.?

By the table, one life of 30 years is 14.68

Multiply by .04

Subtract the product 5872

From 20000

Remains 14128

And 14128)14.68 (10.39 value of 1 l. annuity.

And 10.39 × 100 = 1039 the value sought.

2. If the two persons are of different ages, work as directed in the following

RULE. Take the values of the two lives from the table; multiply them into one another, calling the result the first product; then multiply the said first product by the interest of 1 l. for a year, calling the result the second product; add the values of the two lives, and from their sum subtract the second product; divide the first product by the remainder, and the quot will be the value of 1 l. annuity, or the number of years purchase sought.

EXAMP. What is the value of 70 l. annuity for the joint lives of two persons, whereof one is 40 and the other 50 years of age, reckoning interest at 5 per cent.?

By the table the value of 40 years is 11.83

And the value of 50 years is 10.35

First product, 122.4405

Multiply by .05

Second product, 6.122025

Sum of the two lives, 22.180000

Second product deduct, 6.122025

Remainder, 16.057975

And 16.057975)122.4405 (7.62 value of 1 l. annuity.

70

533.40 value sought.

PROB. 3. To find the value of an annuity upon the longest of two lives; that is, to continue so long as either of the persons is in life.

RULE. From the sum of the values of the single lives subtract the value of the joint lives, and the remainder will be the value sought.

EXAMP. What is the value of an annuity of 1 l. upon

Annui- ties. on the longest of two lives, the one person being 30, and the other 40 years of age, interest at 4 per cent. ?

By the table, 30 years is	-	-	14.68
40 years is	-	-	13.20

Value of their joint lives, by Prob. 2. }	27.88
Cafe 2. is, }	9.62

Value sought, 18.26

If the annuity be any other than 1 l. multiply the answer found as above by the given annuity.

If the two persons be of equal age, find the value of their joint lives by Cafe 1. of Prob. 2.

PROB. 4. To find the value of the next presentation to a living.

RULE. From the value of the successor's life subtract the joint value of his and the incumbent's life, and the remainder will be the value of 1 l. annuity; which multiplied by the yearly income, will give the sum to be paid for the next presentation.

EXAMP. A enjoys a living of 100 l. per annum, and B would purchase the said living for his life after A's death: The question is, What he ought to pay for it, reckoning interest at 5 per cent. A being 60, and B 25 years of age?

			L.
By the table, B's life is	-	-	13.46
Joint value of both lives, by Prob. 2. is	-	-	6.97

The value of 1 l. annuity,	-	-	6.49
Multiply by	-	-	100

Value of next presentation,	-	-	649.00
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The value of a direct presentation is the same as that of any other annuity for life, and is found for 1 l. by the table: which being multiplied by the yearly income, gives the value sought.

PROB. 5. To find the value of a reversion for ever, after two successive lives; or to find the value of a living after the death of the present incumbent and his successor.

RULE. By Prob. 3. find the value of the longest of the two lives, and subtract that value from the value of the perpetuity, and the remainder will be the value sought.

EXAMP. A, aged 50, enjoys an estate or living of 100 l. per annum; B, aged 30, is intitled to his lifetime of the same estate after A's death; and it is proposed to sell the estate just now with the burden of A and B's lives on it: What is the reversion worth, reckoning interest at 4 per cent. ?

			L.
By the table, A's life of 50 is,	-	-	11.34
B's life of 30 is,	-	-	14.68

Sum, 26.02

Value of their joint lives, found by }	-	8.60
--	---	------

Prob. 2. Cafe 2. is, }	-	-
Value of the longest life,	-	17.42 sub.
From the value of the perpetuity,	-	25.00

Remains the value of 1 l. reversion,	-	7.58
Multiply by	-	100

Value of the reversion,	-	-	758.00
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PROB. 6. To find the value of the joint continuance of three lives, one life failing, the annuity to cease.

RULE. Find the single values of the three lives from the table; multiply these single values continually, calling the result the product of the three lives; multiply that product by the interest of 1 l. and that product again by 2, calling the result the double product; then, from the sum of the several products of the lives, taken two and two, subtract the double product; divide the product of the three lives by the remainder, and the quot will be the value of the three joint lives.

EXAMP. A is 18 years of age, B 34, and C 56: What is the value of their joint lives, reckoning interest at 4 per cent. ?

By the table, the value of A's life is 16.1, of B's 14.12, and of C's 10.01.

16.1X14.12X10.01=2275.6, product of the three lives,

.04

91.024

2

182.048, double product.

Product of A and B, 16.1 X 14.12=227.533

A and C, 16.1 X 10.01=161.16

B and C, 14.12 X 10.01=141.34

Sum of all, two and two,	-	-	529.83
Double product subtract	-	-	182.048

Remainder - 347.782

And 347.782/2275.600=6.54 value sought.

PROB. 7. To find the value of an annuity upon the longest of three lives.

RULE. From the sum of the values of the three single lives, taken from the table, subtract the sum of all the joint lives, taken two and two, as found by Prob. 2. and to the remainder add the value of the three joint lives, as found by Prob. 6. and that sum will be the value of the longest life sought.

EXAMP. A is 18 years of age, B 34, and C 56: What is the value of the longest of these three lives, interest at 4 per cent. ?

By the table, the single value of A's life is	16.1
single value of B's life is	14.12
single value of C's life is	10.01

Sum of the single values, 40.23

By Prob. 2. the joint value of A and B is	10.76
joint value of A and C is	8.19
joint value of B and C is	7.65

Sum of the joint lives, 26.60

Remainder, 13.63

By Prob. 6. the value of the 3 joint lives is 6.54

Value of the longest of the 3 lives, 20.17

Other problems might be added, but these adduced are sufficient for most purposes. The reader probably may wish that the reason of the rules, which, it must be owned, are intricate, had been assigned; but this could not be done without entering deeper into the subject than was practicable in this place. See CHANCES.

ANNUITY

Annulity of
Tiends.
||
Annuncia-
tion

ANNUITY OF TIENDS, in Scots law, a certain proportion of the tiends of erected benefices formerly payable to the crown, but now gone into disuse.

ANNULAR, in a general sense, something in the form of, or resembling, a ring. It is also a peculiar denomination of the fourth finger, commonly called the *ring-finger*.

ANNULET, in architecture, a small square member in the Doric capital, under the quarter-round.

Annulet is also a narrow flat moulding, which is common to divers places of the columns, as in the bases, capitals, &c. It is the same member which Vitruvius calls a *fillet*; Palladio, a *lisel* or *cincture*; Scamozzi, and Mr Brown, a *supercilium*, *list*, *tinea*, *eyebrow*, *square*, *rabbit*. See ARCHITECTURE.

ANNULET, a little circle, borne as a charge in coats-of-arms, as also added to them as a *difference*. Among the Romans it represented liberty and nobility. It also denotes strength and eternity, by reason of its circular form.

When this figure is added as a difference, some authors assert, that it serves to remind the bearer to achieve great actions.

ANNULLING, a term sometimes used for cancelling or making void a deed, sentence, or the like.

ANNUNCIADA, **ANNUNTIADA**, or **ANNUNTIA-TA**, an order of knighthood in Savoy, first instituted by Amadeus I. in the year 1409: their collar was of 15 links, interwoven one with another, in form of a true-lover's-knot; and the motto, F. E. R. T. signifying, *Fortitudo ejus Rhodum tenuit*. Amadeus VIII. gave the name *Annunciada* to this order, which was formerly known by that of the *knot of love*; changing at the same time the image of St Maurice patron of Savoy, which hung at the collar, for that of the Virgin Mary; and, instead of the motto above mentioned, substituting the words of the angel's salutation.

ANNUNCIADA is also the title of several religious orders, instituted at different times, and at different places, in honour of the annunciation. See the next article.

ANNUNCIATION, the tidings brought by the angel Gabriel to the Virgin Mary of the incarnation of Christ.

ANNUNCIATION is also a festival, kept by the church on the 25th of March, in commemoration of these tidings. This festival appears to be of very great antiquity. There is mention made of it in a sermon which goes under the name of *Athanasius*. Others carry it up to the time of Gregory Thaumaturgus, because there is a sermon likewise attributed to him upon the same subject. But the best critics reject both these writings as spurious. However, it is certain, this festival was observed before the time of the council of Trullo, in which there is a canon forbidding the celebration of all festivals in Lent, excepting the Lord's day, and the feast of the annunciation: so that we may date its original from the seventh century.

In the Romish church, on this feast, the pope performs the ceremony of marrying or cloistering a certain number of maidens, who are presented to him in the church, clothed in white serge, and muffled up from head to foot: An officer stands by, with purses containing notes of fifty crowns for those who make choice of marriage, and notes of a hundred for those who chuse to veil.

ANNUNCIATION is likewise a title given by the Jews

to part of the ceremony of the passover.

ANNUNCIATOR, the name of an officer in the church of Constantinople. It was his business to inform the people of the festivals that were to be celebrated.

ANODYNE (from *an* privative, and *odyn*, *dolco*; or *a* neg. and *odyn*, pain;) a term applied to medicines which ease pain, and procure sleep. They are divided into three sorts, *viz.* 1. Purgatives, or such as allay pain. 2. Hypnotics, or such as relieve by procuring sleep. 3. Narcotics, or such as ease the patient by stupifying him.

Opiates and narcotics destroy sensation. Some hypnotics and purgatives, as nitre, camphor, &c. procure ease and sleep by removing the offending cause. Camphor is the best anodyne in nervous cases, and at the decline of fevers. The doses of these medicines are generally regulated by the pulse.

ANOLYMPIADES, in antiquity, a name given by the Eleans to those Olympic games which had been celebrated under the direction of the Pisians and Arcadians. The Eleans claimed the sole right of managing the Olympic games, in which they sometimes met with competitors. The hundred and fourth Olympiad was celebrated by order of the Arcadians, by whom the Eleans were at that time reduced very low: this, as well as those managed by the inhabitants of Pisa, they called *anolympiades*, that is, "unlawful Olympiads;" and left them out of their annals, wherein the names of their victors and other occurrences were registered.

ANOMALISTICAL YEAR, in astronomy, the time that the earth takes to pass through her orbit: it is also called the *Periodical Year*. The space of time belonging to this year is greater than the tropical year, on account of the precession of the equinoxes.*

ANOMALOUS, a term applied to whatever is irregular, or deviates from the rule observed by other things of the like nature.

ANOMALOUS Verbs, in grammar, such as are not conjugated conformably to the paradigm of their conjugation. They are found in all languages. In Latin, the verb *lego* is the paradigm of the third conjugation; and runs thus, *lego, legis, legit*: By the same rule it should be *fero, feris, ferit*; but we say *fero, feris, fert*; *fero*, then, is an anomalous verb. In English, the irregularity relates often to the preter tense and passive participle: for example, *give*, were it formed according to rule, would make *gived* in the preter tense and passive participle; whereas, in the former, it makes *gave*, and in the latter *given*.

ANOMALY, in astronomy, an irregularity in the motion of the planets, whereby they deviate from the aphelion or apogee.

ANOMIA, in zoology, a genus of insects belonging to the order of vermes testacea. The shell is bivalve, and the valves are unequal. One valve is perforated near the hinge; affixed by that perforation to some other body. There are 25 species of the anomia; of which, only two are natives of the British seas, *viz.* 1. The ephippium, with the habit of an oyster; the one side convex, the other flat; perforated; adherent to other bodies, often to oyster-shells, by a strong tendinous ligature; colour of the inside, perla-ceous. Size, near two inches diameter. 2. The squamula, with shells resembling the scales of fish; very delicate,

Annuncia-
tor
||
Anomia.

* See *ANOMIA*.

Anomæans
||
Anorexia.

Anoff.

delicate, and silvery; much flatted; perforated; very small. Adheres to oysters, crabs, lobsters, and shells. The species of this genus are commonly called *Beaked cockles*. No name has been given to the fish that inhabit it; for the recent shells of this kind are so very rare, that there is scarcely one to be found perfect. They are perhaps, as well as that which has given its form to the *cornu ammonis*, inhabitants of the deepest parts of the ocean; consequently it must be some extraordinary agitation of that great body of water that can bring them at all to our knowledge in their recent state.

The fossil species of the *Anomia* genus are uncommonly numerous in this island, in our chalk-pits and limestone-quarries; and, in Gloucestershire, they are as common on the ploughed lands as pebbles in other places.

ANOMOEANS, in ecclesiastical history, the name by which the pure Arians were called in the fourth century; in contradistinction to the Semi-Arians. The word is formed from the Greek, ἀνομοῖος, *different, dissimilar*: For the pure Arians asserted, that the Son was of a nature different from, and in nothing like, that of the Father; whereas the Semi-Arians acknowledged a likeness of nature in the Son; at the same time that they denied, with the pure Arians, the consubstantiality of the Word.—The Semi-Arians condemned the Anomæans in the council of Seleucia; and the Anomæans in their turn condemned the Semi-Arians in the councils of Constantinople and Antioch, erasing the word ἀνομοῖος, *like*, out of the Formula of Rimini and that of Constantinople.

ANOMORHOMBOIDIA, in natural history, the name of a genus of spars; the word is derived from the Greek, ἀνομοῖος, *irregular*, and ῥομβοειδὴς a *rhomboidal* figure. The bodies of this genus are pellucid crystalline spars of no determinate or regular external form, but always breaking into regularly rhomboidal masses; easily fissile, and composed of plates running both horizontally and perpendicularly thro' the masses, but cleaving more readily and evenly in an horizontal, than in a perpendicular direction; the plates being ever composed of irregular arrangements of rhomboidal concretions. Of this genus there are five known species. 1. A white, bright, and shattery one; found in great quantities in the lead-mines of Derbyshire, Yorkshire, and Wales. 2. A milk-white, opaque, and shattery one, found in some parts of France, and very plentifully in Germany, and sometimes in Wales and Scotland, and in the hills of Yorkshire. 3. A hard, dull, and snow-white one, found in some of the mines in Derbyshire, and in many of our northern countries. 4. A hard grey and pellucid one, found in the lead-mines of Yorkshire, and very common in Germany. And, 5. A pellucid and colourless one; this is found in the lead-mines of Derbyshire and Yorkshire. All these in some degree have the double refraction of the island crystal. See ISLAND-CRYSTAL.

ANONIS in botany. See ONONIS.

ANONYMOUS, something that is nameless, or of which the name is concealed. It is a term usually applied to books which do not express the author's name, or to authors whose names are unknown.

ANOREXIA, ANOREXY, (from α neg. and ῥῆσις, *appetite*); a want of appetite, or a loathing of Vol. I.

food. The disorder is either original or symptomatic. When it is original, its causes are, bad diet, too free drinking, voraciousness, &c.: In which cases, a vomit or two of ipecacuanha may be taken; and temperance, a light but cordial nourishing diet, and daily exercise, perfited in, will generally effect a recovery. But it is more frequently a symptom of some other disorder; and then the cure depends on the removal of the original one.

ANOSSI, a province of the island of Madagascar, lying between Lat. 23° 18' and 26° S. It is watered by many rivers, most of which run into the *Franchere*, *Ramevatie*, or *Immour*, the spring of which is in a mountain called *Manghage*, and discharges itself into the sea in Lat. 25. 18. S. The mouth of this river is often stopped, and the course to the sea interrupted, unless kept open by the overflowings of great rains and high tides. The water runs salt one league above the mouth, particularly in a free communication with the sea. A lake, called *Ambou*, is formed at the mouth, half a league wide, with depth sufficient for any ship if the mouth of the river was kept open. Next in bigness to the Franchere is the Manghafia, which springs from a mountain called *Siliva*, and empties itself into the sea, where large ships may ride at anchor. Crocodiles breed in these and all the other rivers of the island.

Between the two rivers above-mentioned lies Cape St Romain, half a mile distant from the mouth of the Franchere, and which runs from the north-west fix or seven leagues into the sea. When the Cape is passed, the coast forms a great bay, in the shape of a cross, which extends to the mouth of a river called *Dian Panouge*, or *Pitorah*. In the middle of this bay the land runs out, and almost forms a peninsula called *Tholangare*. Fort Dauphin lies to the north of this peninsula, and Port Dauphin over against it. This province has several other peninsulas and small islands belonging to it. The country is beautiful; abounds in fruit-trees; is fertile in pastures for cattle; and, if carefully cultivated, would produce all the necessaries of life. It is surrounded by high mountains, which are covered with woods and shrubs; but, about four miles distant from Fort Dauphin, the adjacent hills are quite destitute of verdure. The French often dug in this neighbourhood, expecting to meet with mines of gold and silver, particularly in one mountain where several springs flow near each other and empty themselves into a neighbouring river. In this river they found several stones and heaps intermixed with yellow clay, with a great quantity of black and white spangles shining like silver, which they carefully pounded and washed, but without effect. About 60 yards above these springs the grass, and every sort of vegetable, appears half dried and yellow, from a metalline sulphur, which gives that aspect; but the top of the mountain is covered with a fresh and beautiful verdure. It is said that the Portuguese found gold at the foot of this mountain on the north-side, but that the place they had dug was filled up by the chiefs of the country after the Portuguese had been driven out.

The province of Anossi is inhabited by three different sorts of whites, and four sorts of negroes. The whites are distinguished by the names of *Rohandrians*, *Anacandrians*, and *Ondzatsi*. The whites are distinguished from the negroes by the general name of *Zaferamini*,
N n n

Anoff.

feramini, or *Rahimini*; and the Rohandrians are distinguished above the other whites. When they proceeded to an election of a sovereign, whom they call *Ompandrian*, or *Dian Bahouache*; he is chosen from the Rohandrian race. Next to him the others hold the rank of princes, and are honoured as such by all the rest of the subjects. The Anacandrians are descendants of the chiefs, but who have degenerated, and are accounted the bastards of princes, or those who are descended from a Rohandrian and any inferior white or black woman. These are likewise called by the name of *Ontempasemaca*, or people from the sandy parts of Mecca, from whence, they say, came the Rohandrians. Both the Rohandrians and Anacandrians wear long hair, which hangs down in curls; and enjoy the privilege of killing beasts. The Ondzati, or lowest class of whites, are descended from the bastards of the Anacandrians. These are all fishermen, and are allowed to kill no land-animal except a chicken.

The four classes of negroes are named *Voadziri*, *Lohavohits*, *Ontfoa*, and *Ondeves*. The *Voadziri*, the most powerful and the richest, are masters of several villages, and defended from the original lords of the country. They enjoy the privilege of killing beasts, when at a distance from the whites, and no Rohandrian or Anacandrian in the village. The *Lohavohits* are descendants from the *Voadziri*, and also lords; but with this difference, that the one commands a whole district, and the jurisdiction of the others extends only to their own village and family. They are also permitted to kill those beasts they intend to eat, when at a distance from the whites. The *Ontfoa* are next to the *Lohavohits*, and are their near relations. The *Ondeves* are the lowest of all, being originally slaves by father and mother. The *Voadziri*, *Lohavohits*, and *Ontfoa*, enjoy the privilege of submitting themselves, on the death of their lord or king, to any chief they please. In return for such homage the new lord makes them a present, in consequence of which he becomes heir to all their possessions. Hence the lower classes both of whites and blacks, when death approaches, are under the greatest concern and anguish of mind, well knowing that their lords will not fail to deprive their children of every thing they possess. The *Ondeves* have not the same liberty with the others: but, in times of famine, the chiefs are obliged to supply them with necessaries; which if they fail to do, they have the liberty of submitting themselves to new masters. The inhabitants of this province have no temples, and very little appearance of religion; only they keep up a custom of immolating beasts upon particular occasions, as in sickness, planting yams or rice, on assemblies, &c. They offer the first-born beast to the devil and to God, naming the devil first, in this manner, *Dianbilis Aminbahabare*, or, "Lord Devil and God."—There are several towns on the river Franchere; and near this river the Portuguese had a fort built upon a steep rock, and several buildings below, with inclosures, which furnished all sorts of necessaries for their subsistence; but they were all massacred by the natives.

This province seems originally to have been inhabited by negroes. The whites or *Zaferamini* settled in it about 200 years ago, and conquered the negroes. But they themselves were conquered by the French, though under the government of a king whom they honoured

as a god. In 1642, captain Rivault obtained a permission to establish a colony in this part of the island; and accordingly he took possession of it in the name of the king of France, in the month of September, that same year. The French landed 200 men well armed and provided with store of ammunition and other necessaries for building a fort, which they immediately set about; but no sooner did the natives observe their intention, than they used their utmost art to prevent their design from taking effect. This created a war, in which the French were victors; and, the natives becoming in time much better reconciled to them, they intermarried, and lived up and down in several towns at some distance from one another, not above five or six in a place. This tranquillity lasted for some years; but at last the natives, growing jealous, resolved to free themselves from a foreign yoke, and accordingly formed a conspiracy to cut off all the French in one day; which they soon after effected, not leaving a single person alive. In 1644 the above-mentioned Fort Dauphin was erected in Lat. 25. 6. S. Many buildings were erected, behind the Fort, adjoining to the governor's house, with great inclosures that produced every sort of fruit and kitchen herb. In 1656 this fort was accidentally destroyed by fire; but was soon after repaired, and still continues notwithstanding the catastrophe above-mentioned, and its garrison carries on frequent wars with the natives.

ANOUT, a small island in the Schagerrack, or that part of the sea of Denmark which has Norway on the north, Jutland on the west, and the isle of Zealand on the south; it lies in 13° E. Long. and 56° 36' N. Lat.

ANSÆ, in astronomy, implies the parts of Saturn's ring projecting beyond the disk of the planet.—The word is Latin, and properly signifies *handles*; these parts of the ring appearing like handles to the body of the planet.

ANSE, an ancient town of France, in the Lyonois, ten miles north of Lyons, Long. 6. 55. N. Lat. 45. 55.

ANSELM, archbishop of Canterbury, in the reigns of William Rufus and Henry I. He was born in the year 1033, at Aost, a town in Savoy at the foot of the Alps. He became a monk in the abbey of Bec in Normandy; of which he was afterwards chosen prior, and then abbot. In the year 1092, he was invited over to England by Hugh earl of Chester; and in the year following was prevailed on, as we are told, with great difficulty, to accept the archbishopric of Canterbury. He enjoyed celibacy on the clergy; for which he was banished by king Rufus, but recalled by Henry at his coming to the crown. He refused to consecrate such bishops as were invited by the king, according to pope Urban's decree; flatly denying it to be the king's prerogative: for this he was outh again; till, the pope and king agreeing, he was recalled in 1107. In short, from the day of his consecration to that of his death, he was continually employed in fighting the prerogative of the church against that of the crown; and for that purpose spent much of his time in travelling backwards and forwards between England and Rome, for the advice and direction of his holiness. At the council of Bari, in the kingdom of Naples, the pope being puzzled by the arguments of the Greeks against the Holy Ghost's proceeding from the Father, he called upon Anselm, who was present, and he discussed their objections with great applause. Priests call him a resolute faint; to o-
ther

Anoff.

Anselm.

Anfelm
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Anfiko.

ther people he appears to have been an obstinate and insolent priest. He wrought many miracles, if we believe the author of his life, both before and after his death, which happened at Canterbury, in the 76th year of his age, anno 1109. He was canonised in the reign of Henry VII. Anfelm, tho' we may disregard him as a saint, deserves to be remembered as one of the principal revivers of literature, after three centuries of profound ignorance.

His works have been printed in different years, and at different places, viz. Nuremb. 1491. Paris, 1544 and 1549. Venice, 1549. Cologne, 1573 and 1612. Lyons, 1630. But the best is that of father Gerberon, printed at Paris, 1675. It is divided into three parts; the first contains dogmatical tracts, and is intitled *Mologia*; the second contains practical and devotional tracts; the third part consists of letters, in four books.

ANSER, in ornithology, the trivial name of a species of anas. See ANAS.

ANSER, in astronomy, a small star, of the fifth or sixth magnitude, in the milky way, between the swan and eagle, first brought into order by Hevelius.

ANSERES, the name which Linnaeus gives to his third order of birds. See ZOOLOGY, n° 8.

ANSIBARII, or ANSIVARII, an ancient people of Germany, situated somewhere in the neighbourhood of the Chauci. All we know of their history is, that, in the reign of the Emperor Nero, they were driven from their own possessions by the Chauci. Being then in a forlorn condition, they took possession of some uninhabited lands, which had been used as pasture for the horses of the Roman soldiers. They were led by one Boiocalus, a man of great valour, and of known fidelity to the Romans. He remonstrated to the Romans, who objected to their taking possession of these lands, that the territory in dispute was large; and requested, that it might be allowed to an unhappy people, driven from their own habitations: that, at the same time, wide tracts might be retained for the horses and cattle of the soldiers to graze in: that it was inconsistent with humanity to famish men in order to feed beasts, &c. and at last, lifting up his eyes to heaven, he asked the celestial luminaries how they could behold a desolate soil, and if they would not more justly let loose the sea to swallow up usurpers, who had engrossed the whole earth? To this the Roman commander, Avitus, replied, that the weakest must submit to the strongest; and that, since the gods, to whom they had appealed, had left the sovereign judgment to the Romans, they were resolved to suffer no other judges than themselves. To Boiocalus himself, however, he privately offered lands as a reward for his long attachment to the Romans: but this offer the brave German rejected, as a price for betraying his people; adding, "A place to live in we may want, but a place to die in we cannot." The Ansibarii now invited the neighbouring nations to join them against the Romans; but they, dreading the power of that nation, refused to give them any assistance: upon which they applied to the neighbouring nations, begging leave to settle in their territories; but being every where driven out as enemies and intruders, these unhappy people were reduced to wander up and down till every one of them perished.

ANSIKO, a kingdom of Africa, bounded on the west by the river Umbre which runs into the Zaire,

the kingdom of Wangua, and the Amboes who border on Loango; on the north, by some deserts of Nubia; and on the south, by Songo and Sonda, provinces of Congo. Here are great numbers of wild beasts, as lions, rhinoceroses, &c. and many copper mines. The king of Anfiko, or the great Macoco, commands 13 kingdoms, and is esteemed the most powerful monarch in Africa. The inhabitants of Angola have a tradition, that this is the proper country of the Giasas, who came originally from Sierra Leona, and over-ran like a torrent the whole coast as far as Benguela; that, being weakened by numerous battles, and unable to force the desiles in order to return to Sierra Leona, they arrived on the borders of Monomotapa, where being defeated, they were forced to remain in the provinces of Anfiko. Be this as it will, the Ansikans yield not in the least to the Giasas in fierceness and barbarity. They are so accustomed to the eating of human flesh, that it is asserted they have markets where it is publicly sold, and that there are no other graves for the dead than the bellies of the living. They try the courage of their prisoners of war by shooting at them as at marks, directing their arrows above or around their heads; and whoever discovers the least signs of fear, is immediately devoured without remedy. Those who appear intrepid and resolute, have their noses and ears bored, and two fore-teeth of the upper jaw drawn. They are then improved in barbarity, by accustoming them to the most horrid cruelties.

The Ansikans are neat, well-proportioned, and strong; wandering about from place to place, without either sowing or reaping. They are dreaded for their extreme brutality, and never traded with by the Europeans. Their language is barbarous, and difficult to be learned, even by the inhabitants of Congo. The most distinguished among them wear red and black caps of Portuguese velvet; the lower ranks go naked from the waist upwards; and, to preserve their health, anoint their bodies with a composition of pounded white sandal-wood, and palm-oil. Their arms are battle-axes, and small but very strong bows adorned with serpents skins. Their strings are made of supple and tender shoots of trees, that will not break, and their arrows of hard and light wood. These people, who kill birds flying, shoot with such surprising swiftness, that they can discharge 28 arrows from the bow before the first falls to the ground. With equal dexterity they manage their battle-axes; one end of which is sharpened and cuts like a wedge, and the other flattened like a mallet, with an handle set between, about half the length of the iron, rounded at the end like an apple, and covered with the skin of a serpent.—The current money in this country is the zimbis or shell, which is fished for, and passes among several African nations.—They worship the sun as their chief deity; whom they represent by the figure of a man, and the moon by that of a woman. They have also an infinite number of inferior deities, each individual having a particular idol whom he addresses on certain occasions.

ANSLO, a sea-port town of Norway, in the province of Aggerhuys, with a bishop's see. The supreme court of justice is held here for Norway. It is seated on a bay of the same name. E. Long. 10. 14. N. Lat. 50. 24.

ANSON (George), a gentleman whose merit and good fortune, as a naval commander, exalted him to the

Anfiko
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Anfon.

Anson
Anspach.

rank of nobility. He was the son of William Anson, Esq; of Hunkborough, in Staffordshire; and, shewing an early inclination for the sea, received a suitable education. The first command he enjoyed was that of the *Weazle* sloop, in 1722; but the most memorable action of his life, and the foundation of his future good fortune, took place on his receiving the command of five ships, a sloop, and two victuallers, equipped to annoy the Spaniards in the South seas, and to co-operate with admiral Vernon across the Isthmus of Darien: an expedition the principal object of which failed by the unaccountable delay in fitting him out. He failed, however, in Sept. 1740; doubled Cape Horn in a dangerous season; lost most of his men by the scurvy; and with only one remaining ship, the *Centurion*, crossed the great Pacific Ocean. If no considerable national advantage resulted from this voyage, Commodore Anson made his own fortune, and enriched his surviving companions, by the capture of a rich galleon on her passage from Acapulco to Manila; with which he returned home round the Cape of Good Hope. If he was lucky in meeting this galleon, he was no less fortunate in escaping a French fleet then cruising in the channel, by sailing through it during a fog. He arrived at Spithead in June 1744. In a short time after his return, he was appointed rear-admiral of the blue, and one of the lords of the admiralty. In April 1745, he was made rear-admiral of the white, and the following year vice-admiral of the blue; at which time he was chosen to represent the borough of Heydon in parliament. In 1747, being on board the *Prince George* of 90 guns, in company with Admiral Warren, and twelve other ships, he intercepted, off Cape Finisterre, a powerful fleet, bound from France to the East and West Indies; when, by his valour and conduct, he again enriched himself and his officers, and at the same time strengthened the British navy, by taking six men of war and four East-Indiamen, not one of them escaping. The French admiral, M. Jonquiere, on presenting his sword to the conqueror, said, *Monsieur, vous avez vaincu l'Invincible, et la Gloire vous suit*: "Sir, you have conquered the *Invincible*, and *Glory* follows you;" pointing to the ships, named the *Invincible* and the *Glory*, he had taken. For his signal services, his late majesty created him Baron of Soberton, in Hants. The same year he was appointed vice-admiral of the red; and, on the death of Sir John Norris, was made vice-admiral of England. In 1748 he was made admiral of the blue: he was afterwards appointed first lord of the admiralty, and was at length made admiral and commander in chief of his majesty's forces; in which rank he continued, with a very short interval, until his death; and the last service he performed was to convoy queen Charlotte to England. He died in June 1762. No performance ever met with a more favourable reception, than the account of Anson's voyage round the world. Tho' it is printed under the name of his chaplain, it was composed under his lordship's own inspection, and from the materials he himself furnished, by the ingenious Mr Benjamin Robins.

ANSPACH (the marquise of) is a small territory of Franconia, in Germany, bounded on the north by the bishopricks of Würzburg and Bamberg, which last likewise lies to the west; the earldoms of Holsach and Oetting, with the bishoprick of Aichstet, lie on the

south; and the palatinate of Bavaria and the territory of Nuremberg on the east. The country is fruitful, and interspersed with woods, which render it agreeable for hunting. Besides the city Anspach, which is the capital, the chief towns are Kreglin, Swabach, Kreilheim, Rot, and Waffer-Truding.

ANSFACH is a small but pretty town, very well built, and has several churches. It is walled round, but has no other fortifications. In the palace there is a remarkable cabinet of curiosities. It is seated on a river of the same name, and belongs to the house of Brandenburg. E. Long. 10. 42. N. Lat. 49. 14.

ANSPESSADES, in the French armies, a kind of inferior officer in the foot, below the corporals, but above the common centinels. There are usually four or five of them in a company.

ANSTRUTHER *Easterr*, and *Westerr*, two royal burghs of Scotland, situated on the south-east coast of the county of Fife, in W. Long. 2. 25. N. Lat. 56. 20.

ANT, in zoology. See FORMICA.

ANT-Bear, or *Ant-eater*, in zoology. See MYRMECOPHAGA.

ANT-Lion, in zoology. See FORMICA-Leo.

ANT-Eggs, a name popularly given to a kind of little white balls found in the banks or nests of ants, ordinarily supposed to be the ova of this insect.

Late naturalists have observed, that these are not properly the ants eggs, but the young brood themselves in their first state; they are so many little vermiculi wrapped up in a film, or skin, composed of a sort of silk, which they spin out of themselves as silk-worms and caterpillars do. At first they are hardly observed to stir: but, after a few days continuance, they exhibit a feeble motion of flexion and extension; and begin to look yellowish and hairy, shaped like small maggots, in which shape they grow up till they are almost as large as ants. When they pass their metamorphosis, and appear in their proper shape, they have a small black speck on them close to the anus of the included ant, which M. Lewenhoeck probably enough imagines to be the faeces voided by it. Dr Ed. King opened several of these vulgarly reputed eggs; in some of which he found only a maggot in the circumstances as above described; while in another the maggot had begun to put on the shape of an ant about the head, having two little yellow specks, where the eyes were to be. In others, a further progress was observed, the included maggots being furnished with every thing to complete the shape of an ant, but wholly transparent, the eyes only excepted, which were as black as bugles. Lastly, in others, he took out every way perfect and complete ants, which immediately crept about among the rest. These supposed ants eggs are brought up every morning in summer, near the top of the bank, where they are lodged all the warm part of the day, within reach of the sun's influence. At night, or if it be cool, or like to rain, they carry them down to a greater depth; so that you may dig a foot depth e'er you come at them. The true ants eggs are the white substance which, upon opening their banks, appears to the eye like the scatterings of fine white sugar, or salt, but very soft and tender. Examined by a microscope, it is found to consist of several pure, white appearances, in distinct membranes, all figured like the lesser foot of birds eggs, and as clear as a fishes bladder. The same substance

Anspach
Ant-eggs.

Ant-hills
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Antacids.

is found in the bodies of the ants themselves. On this spawn, when emitted, they lie in multitudes, to brood, till in some time it is turned into little vermicles as small as mites, commonly called *ants-eggs*.

ANT-HILLS, are little hillocks of earth, which the ants throw up for their habitation and the breeding of their young. They are a very great mischief to dry pastures, not only by waisting so much land as they cover, but by hindering the scythe in mowing the grass, and yielding a poor hungry food pernicious to cattle. The manner of destroying them is to cut them into four parts from the top, and then dig into them so deep as to take out the core below, so that, when the turf is laid down again, it may lie somewhat lower than the level of the rest of the land: by this means it will be wetter than the rest of the land; and this will prevent the ants from returning to the same place, which otherwise they would certainly do. The earth that is taken out must be scattered to as great a distance every way as may be, otherwise they will collect it together and make another hill just by. The proper time for doing this is winter; and if the places be left open, the frost and rains of that time of the year will destroy the rest: but in this safe care must be taken that they are covered up early enough in the spring, otherwise they will be less fertile in grass than the other places. In Hertfordshire they use a particular kind of spade for this purpose. It is very sharp, and formed at the top into the shape of a crescent, so that the whole edge makes up more than three fourths of a circle; this cuts in every part, and does the business very quickly and effectually. Others use the same instruments that they do for mole-hills. Human dung is a better remedy than all these, as is proved by experiment; for it will kill great numbers of them, and drive all the rest away, if only a small quantity of it be put into their hills.

ANTA, in the ancient architecture, a square pilaster, placed at the corners of buildings.

ANTA, or *Ante*, a small kingdom on the gold coast of Africa, extending about ten leagues in length.—The country is covered with large trees, among which stand a number of fine villages. The soil is exceedingly rich, and the face of the country beautiful. The air is also much more salubrious than in other places of the gold coast; it being observed by all writers, that the number of deaths here bears no proportion to that on any other part on the coasts of Guinea. This country contains the following villages, which deserve a particular description on account of the commerce they drive; viz. *Bourtrey*, *Tokorari*, *Sukoadia*, and *Sama*; for which, see those articles.—Formerly Anta was potent and populous, inhabited by a bold and rapacious people, who greatly annoyed the Europeans by their frequent incursions; but by continual wars with their neighbours they are now greatly enfeebled, and the country in a manner depopulated. The spirit of the few remaining inhabitants is fled: they are desponding, dispirited, and abject, seeking protection from the Dutch and other Europeans who have forts on this coast, and looking upon them as their best friends.

ANTACIDS, in pharmacy, an appellation given to all medicines proper to correct acid or four humours.

Under the class of antacids come, 1. Astringents; as chalk, coral, sea-shells, hæmatites, and steel filings.

2. Obductants; as oils, and fats. 3. Immutants; as

lixivious salts, and soaps.

ANTÆUS, in fabulous history, a giant of Libya, son of Neptune and Terra. Designing to build a temple to his father, of mens skulls, he slew all he met; but Hercules fighting him, and perceiving the assistance he received from his mother (for by a touch of the earth he refreshed himself when weary), lifted him up from the earth, and squeezed him to death.

ANTAGONIST, denotes an adversary, especially in speaking of combats and games.

ANTAGONIST muscles, in anatomy, those which have opposite functions; as flexors and extensors, abductors and adductors, &c.

ANTANACLASIS, in rhetoric, a figure which repeats the same word, but in a different sense; as, *dum vivimus, vivamus*.

ANTAGOGUE, in rhetoric, a figure by which, when the accusation of the adversary is unanswerable, we load him with the same or other crimes.

ANTAPHRODISIACS, in pharmacy, medicines proper to diminish the semen, and consequently extinguish or lessen all desires of venery.

ANTARCTIC, in a general sense, denotes something opposite to the arctic or northern pole. Hence antarctic circle is one of the lesser circles of the sphere, and distant only 23° 30' from the south pole, which is likewise called antarctic for the same reason.

ANTARES, in astronomy, the name of a star of the first magnitude, called also the scorpion's heart. Its longitude is 60° 13' 14" of Sagittarius; and its latitude 4° 31' 26" S.

ANTAVARE, a province of the Island of Madagascar, lying about 21° 30' S. Lat; and bounded by the province and cape of Manazari, whose source it is watered by the river Manazari, whose source is in the red mountains of Ambohitine.

ANTE, in heraldry, denotes that the pieces are let into one another in such form as there is expressed; for instance, by dove-tails, rounds, swallow-tails, or the like.

ANTEAMBULONES, in Roman antiquity, servants who went before persons of distinction to clear the way before them. They used this formula, *Date locum domino meo*, i. e. Make room or way for my master.

ANTECEDENT, in general, something that goes before another, either in order of time or place.

ANTECEDENT, in grammar, the words to which a relative refers.

ANTECEDENT, in logic, is the first of the two propositions in an enthymeme.

ANTECEDENT, in mathematics, is the first of two terms of a ratio, or that which is compared with the other.

ANTECEDENCE, in astronomy, an apparent motion of a planet towards the west, or contrary to the order of the signs.

ANTECESSOR, one that goes before. It was an appellation given to those who excelled in any science. Justinian applied it particularly to professors of civil law; and, in the universities of France, the teachers of law take the title *anteceffores* in all their theses.

ANTECURSORES, in the Roman armies, a party of horse detached before, partly to get intelligence, provisions, &c. and partly to chuse a proper place to encamp in. These were otherwise called *anteceffores*, and by the Greeks *prodrömi*.

ANTEDATE,
Ante-
Antecur-
res.

ANTEDATE, among lawyers, a spurious or false date prior to the true date of a bond, bill, or the like.

ANTEDILUVIAN, in a general sense, implies something that existed before the flood.

ANTEDILUVIAN *World*; the earth as it existed before the flood. See *EARTH*.

ANTEDILUVIANS, a general name for all mankind who lived before the flood, and so includes the whole of the human race from Adam to Noah and his family.—Concerning them all the authentic particulars we have are contained in the book of Genesis; and from the short hints given there, we can only form a few conjectures.

The only thing we know as to their religious rites is, that they offered sacrifices, and that very early, both of the fruits of the earth, and of animals; but whether the blood and flesh of the animals, or only their milk and wool, were offered, is a disputed point.—Some have endeavoured to prove, that all the patriarchs from Adam had stated places, and annual and weekly times, set apart for divine worship, and also a separate maintenance for the priests: all which particulars may be true, though they cannot be made out from scripture. But what is more extraordinary, they pretend to tell us the very day of the week on which the antediluvian sabbath was kept; and that it was the same with the Christian sabbath, or Sunday.

Of the arts and sciences of these people we have not much more to say. They seem rather to have spent their time in luxury and wantonness, to which the abundant fertility of the first earth invited them, than in discoveries or improvements, which probably they stood much less in need of than their successors. The art of working metals was found out by the last generation of Cain's line; and music, which they might be supposed to practise for their pleasure, was not brought to any perfection, if invented, before the same generation. Some authors have supposed astronomy to have been cultivated by the antediluvians, though this is probably owing to a mistake of Josephus: but it is to be presumed, the progress they made therein, or in any other science, was not extraordinary; it being even very doubtful whether letters were so much as known before the flood; whatever is pretended by some men, who have conceived so high an opinion of Adam's knowledge, that they suppose it to have been almost universal: nor can any thing be inferred from the books attributed to that patriarch, or to Seth, and Enoch, which are forgeries too gross to deserve any consideration.

As to their politics and civil constitutions, we have not so much as any circumstances whereon to build conjectures. It is probable, the patriarchal form of government, which certainly was the first, was set aside when tyranny and oppression began to take place, and much sooner among the race of Cain than that of Seth. It seems also, that their communities were but few, and consisted of vastly larger numbers of people than any formed since the flood: or rather, it is a question, whether, after the union of the two great families of Seth and Cain, there were any distinction of civil societies, or diversity of regular governments, at all. It is more likely, that all mankind then made but one great nation, though living in a kind of anarchy, divided into several disorderly associations; which, as it was almost the na-

tural consequence of their having, in all probability, but one common language, so it was a circumstance which greatly contributed to that general corruption, which otherwise perhaps could not have so universally overspread the antediluvian world. And for this reason chiefly, as it seems, so soon as the posterity of Noah were sufficiently increased, a plurality of tongues was miraculously introduced, in order to divide them into distinct societies, and thereby prevent any such total depravation for the future. See *CONFUSION OF TONGUES*.

The antediluvian world was, in all probability, stocked with a much greater number of inhabitants than the present earth either actually does, or perhaps is capable of containing or supplying. This seems naturally to follow from the great length of their lives, which exceeding the present standard of life in the proportion, at least, of ten to one, the antediluvians must accordingly in any long space of time double themselves, at least, in about the tenth part of the time in which mankind do now double themselves: for they began to beget children as early, and left off as late, in proportion, as men do now, and the several children of the same father seem to have succeeded as quickly one after another as they usually do at this day; and as many generations, which are but successive with us, were contemporary before the flood; the number of people living on the earth at once would be by that means sufficiently increased to answer any defect which might arise from other circumstances not considered. So that, if we make a computation on these principles, we shall find, that there were a considerable number of people in the world at the death of Abel, though their father Adam was not then 130 years old; and that the number of mankind before the deluge would easily amount to above one hundred thousand millions (even according to the Samaritan chronology), that is, to twenty times as many as our present earth has, in all probability, now upon it, or can well be supposed capable of maintaining in its present constitution.

The following table, made upon the abovementioned principles by Mr Whifton, shews at least what number of people might have been in the antediluvian world.

Number of mankind.	Year of the world.	Year of deluding.	Series.
4	2	2	1
8	6	4	2
16	12	6	3
32	20	8	4
64	30	10	5
128	42	12	6
256	56	14	7
512	72	16	8
1024	90	18	9
2048	110	20	10
4096	132	22	11
8192	156	24	12
16,384	182	26	13
32,768	210	28	14
65,536	240	30	15
131,072	272	32	16
262,144	306	34	17

524,288	342	36	18
1,048,576	380	38	19
2,097,152	420	40	20
4,194,304	462	42	21
8,388,608	506	44	22
16,777,216	552	46	23
33,554,432	600	48	24
67,108,864	650	50	25
134,217,728	702	52	26
268,435,456	756	54	27
536,870,912	812	56	28
1,073,741,824	870	58	29
2,147,483,648	930	60	30
4,294,967,296	992	62	31
8,589,934,592	1056	64	32
17,179,869,184	1122	66	33
34,359,738,368	1190	68	34
68,719,476,736	1260	70	35
137,438,953,472	1332	72	36
274,877,906,944	1406	74	37
549,755,813,888	1482	76	38

As to any history of transactions before the flood, besides the general account already given, we are left entirely in the dark by the sacred historian. The Jews and eastern nations, however, have made ample amends for the silence of Moses, by the abundance of fables they have invented. The only part of their traditions which can be connected in any thing like history is what follows.—After the death of Adam, Seth with his family separated themselves from the profligate race of Cain, and chose for their habitation the mountain where Adam was buried, the Cainites remaining below in the plain where Abel was killed; and, according to our historians, this mountain was so high, that the inhabitants could hear the angels singing the praises of God, and even join them in that service. Here they lived in great purity and sanctity of manners. Their constant employment was praising God, from which they had few or no avocations; for their only food was the fruits of the trees which grew on the mountain, so that they had no occasion to undergo any servile labours, nor the trouble of sowing and gathering in their harvest. They were utter strangers to envy, injustice, or deceit. Their only oath was, “By the blood of Abel;” and they every day went up to the top of the mountain to worship God, and to visit the body of Adam, as a mean of procuring the Divine blessing. Here, by contemplation of the heavenly bodies, they laid the foundations of the science of astronomy; and, lest their inventions should be forgotten, or lost before they were publicly known, underlining, from a prediction of Adam’s, that there would be a general destruction of all things, once by fire, and once by water, they built two pillars, one of brick, and the other of stone, that if the brick one happened to be overthrown by the flood, or otherwise destroyed, that of stone might remain. This last, Josephus says, was to be seen in his time in the land of Siriad, (thought to be in Upper Egypt).

The descendants of Seth continued in the practice of virtue till the 40th year of Jared, when an hundred of them hearing the noise of the music, and the riotous mirth of the Cainites, agreed to go down to them from the holy mountain. On their arrival in the plain, they were immediately captivated by the beauty of the women, who were naked, and defiled themselves with them; and this is what they mean by the intermarriage of the sons of God with the daughters of men, mentioned by Moses. The example of these apostate sons of Seth was soon followed by others; and from time to time, great numbers continued to descend from the mountain, who, in like manner, took wives from the abandoned race of Cain. From these marriages sprung the giants, (who, however, according to Moses, existed before); and, these being as remarkable for their impiety as for their strength of body, tyrannized in a cruel manner, and polluted the earth with wickedness of every kind. This defection became at last so universal, that none were left in the holy mountain, except Noah, his wife, his three sons and their wives.

Berosus, a Chaldean historian, who flourished in the time of Alexander the Great, enumerates ten kings who reigned in Chaldea before the flood; of whom the first, called *Alorus*, is supposed to be Adam, and Xifuthrus, the last, to be Noah.—This Alorus declared that he held his kingdom by divine right, and that God himself had appointed him to be the pastor of the people. According to our historian, in the first year of the world, there appeared out of the Red Sea, at a place near the confines of Babylonia, a certain *irrational* animal called *Oanner*. He had his whole body like that of a fish; but beneath his fishes head grew another of a different sort, (probably a human one). He had also feet like a man, which proceeded from his fishes tail, and a human voice, the picture of him being preserved ever after. This animal conversed with mankind in the day-time, without eating any thing: he delivered to them the knowledge of letters, sciences, and various arts: he taught them to dwell together in cities, to erect temples, to introduce laws, and instructed them in geometry: he likewise shewed them how to gather seeds and fruits, and imparted to them whatever was necessary and convenient for a civilized life; but after this time there was nothing excellent invented. When the sun set, Oannes retired into the sea, and continued there all night. He not only delivered his instructions by word of mouth, but, as our author assures us, wrote of the origin of things, and of political economy. This, or a similar animal, is also mentioned by other authors.

Of Alasporus, the second king, nothing remarkable is related. His successor, Amelon, or Amillarns, was of a city called *Pantabilla*. In his time another animal resembling the former appeared, 260 years after the beginning of this monarchy. Amelon was succeeded by Metalarus, and he by Daonus, all of whom were of the same city. In his time, four animals, of a double form, half man and half fish, made their appearance. Their names were *Euedocus*, *Eneugamus*, *Encubulus*, and *Amenetus*. Under the next prince, who was likewise of Pantabilla, appeared another animal of the same kind, whose name was *Odacon*. All these explained more particularly what had been con-

cludedly

Antediluvians. cifully delivered by Oannes.

In the reign of the tenth king, Xifuthrus, happened the great deluge, of which our author gives the following account: Cronus, or Saturn, appeared to Xifuthrus in a dream, and warned him, that on the fifteenth of the month Deſius mankind would be deſtroyed by a flood; and therefore commanded him to write down the original, intermediate ſtate, and end of all things, and bury the writings under ground in Sippara, the city of the ſun; that he ſhould alſo build a ſhip, and go into it with his relations and deareſt friends, having firſt furniſhed it with provisions, and taken into it fowls and four-footed beaſts; and that, when he had provided every thing, and was aſked whether he was failing, he ſhould answer, *To the gods, to pray for happineſs to mankind*. Xifuthrus did not diſobey, but built a veſſel, whoſe length was five furlongs, and breadth two furlongs. He put on board alſo he was directed, and went into it with his wife, children, and friends. The flood being come, and ſoon ceaſing, Xifuthrus let out certain birds, which finding no food, nor place to reſt upon, returned again to the ſhip. Xifuthrus, after ſome days, let out the birds again; but they came back again to the ſhip, having their feet daubed with mud: but when they were let go the third time, they came no more to the ſhip, whereby Xifuthrus underſtood, that the earth appeared again; and thereupon he made an opening between the planks of the ſhip, and ſeeing that it reſted on a certain mountain, he came out with his wife, and his daughter, and his pilot; and having worſhipped the earth, and raiſed an altar, and ſacrificed to the gods, he and thoſe who went out with him diſappeared. They who were left behind in the ſhip, finding Xifuthrus, and the perſons that accompanied him, did not return, went out themſelves to ſeek for him, calling him aloud by his name: but Xifuthrus was no more ſeen by them; only a voice came out of the air, which enjoined them, as their duty was, to be religious; and informed them, that, on account of his own piety, he was gone to dwell with the gods; and that his wife, and daughter, and pilot, were partakers of the ſame honour. It alſo directed them to return to Babylon, and that, as the fates had ordained, they ſhould take the writings from Sippara, and communicate them to mankind; and told them, that the place where they were was the country of Armenia. When they had heard this, they offered ſacrifice to the gods, and unaniſmouſly went to Babylon; and when they came thither, they dug up the writings at Sippara, built many cities, raiſed temples, and rebuilt Babylon again.

The Egyptians, who would give place to no nation in point of antiquity, have alſo a ſeries of kings, who, as is pretended, reigned in Egypt before the flood; and, to be even with the Chaldeans, began their account the very ſame year that theirs does according to Beroſus.

There was an ancient chronicle extant among the Egyptians, not many centuries ago, which contained 30 dynasties of princes who ruled in that country, by a ſeries of 113 generations, through an immenſe ſpace of 36,525 years, during which Egypt was ſucceſſively governed by three different races; of whom the firſt were the Auritæ, the ſecond the Meſtræi, and the third the Egyptians.

But this extravagant number of years Manetho (to whoſe remains we muſt chiefly have recourſe for the an-

cient Egyptian hiſtory) has not adopted, however in other reſpects he is ſuppoſed to have been led into errors in chronology by this old chronicle, which yet ſeems to have been a compoſition ſince Manetho's time.

The account given by Beroſus is manifeſtly taken from the writings of Moſes; but we have another account of the firſt ages of mankind, in which no mention is made of the flood at all. This is contained in ſome fragments of a Phœnician author called *Sancho-niatho*, who is by ſome ſaid to have been cotemporary with Gideon, by others to have lived in the days of king David; while ſome boldly aſſert there never was ſuch a perſon, and that the whole is a fiction of Philo-Biblius, in oppoſition to the books of Joſephus wrote againſt Apion. To gratify the readers curioſity, however, we have ſubjoined an account of the firſt ten generations mentioned by him, which are ſuppoſed by the compilers of the univerſal hiſtory to correſpond to the generations mentioned by Moſes before the flood.

Sanchoiatho having delivered his cosmogony, or generation of the other parts of the world, begins his hiſtory of mankind with the production of the firſt pair of mortals, whom Philo, his tranſlator, calls *Protopogonus* and *Æon*, the latter of whom found out the food which was gathered from trees.

Their iſſue were called *Genus* and *Genea*, and dwelt in Phœnicia; but when the great droughts came, they ſtretched forth their hands to heaven towards the ſun; for him they thought the only God and Lord of heaven, calling him *Beſſamen*, which in Phœnician is, *Lord of heaven*, and in Greek, *Zeus*.

Afterwards from *Genus*, the ſon of *Protopogonus* and *Æon*, other mortal iſſue was begotten, whoſe names were *Phos*, *Pur*, and *Phlox*; that is, *Light*, *Fire*, and *Flame*. Theſe found out the way of generating fire, by the rubbing of pieces of wood againſt each other, and taught men the uſe thereof. Theſe begat ſons of vaſt bulk, and height, whoſe names were given to the mountains on which they ſiezed: ſo from them were named mount *Caffius*, and *Libanus*, *Antilibanus*, and *Brathys*.

Of theſe laſt were begotten *Memramus*, and *Hypſuranius*, but they were ſo named by their mothers, the women of thoſe times, who without ſhame lay with any man they could light upon. *Hypſuranius* inhabited Tyre, and he invented the making of huts of reeds and ruſhes, and the papyrus. He alſo fell into enmity with his brother *Uſous*, who firſt invented a covering for his body out of the ſkins of the wild beaſts which he could catch. And when violent tempeſts of winds and rains came, the boughs in Tyre, being rubbed againſt each other, took fire, and burnt the wood there. And *Uſous*, having taken a tree, and broke off its boughs, firſt was ſo bold as to venture upon it into the ſea. He alſo conſecrated two rude ſtones, or pillars, to fire and wind, and he worſhipped them, and poured out to them the blood of ſuch wild beaſts as had been caught in hunting. But when theſe were dead, thoſe that remained, conſecrated to them ſtumps of wood and pillars, worſhipping them, and kept anniversary feaſts unto them.

Many years after this generation, came *Agreus* and *Halicus*, the inventors of the arts of hunting and fiſhing, from whom huntſmen and fiſhermen are named.

Of theſe were begotten two brothers, the inventors

of iron and of the forging thereof: one of these, called *Chryſor*, the ſame with *Hepheſtus*, or *Vulcan*, exerciſed himſelf in words and charms and divinations; found out the hook, bait, and fiſhing line, and boats ſlightly built, and was the firſt of all men that failed. Wherefore he alſo was worſhipped after his death for a god; and they called him *Zeus Michius*, or *Jupiter* the engineer; and ſome ſay, his brothers invented the way of making walls of brick.

Afterwards from this generation came two brothers; one of whom was called *Technites*, or the Artift; the other, *Geinus Autochthon*, [the home-born man of the earth.] Theſe found out to mingle ſtubble, or ſmall twigs, with the brick earth, and to dry them in the ſun, and ſo made tiling.

By theſe were begotten others; of which one was called *Agrus* [Field]; and the other *Agrouerus*, or *Agrotus*, [Huſbandman], who had a ſtatue much worſhipped, and a temple carried about by one or more yoke of oxen, in Phœnicia, and among thoſe of Byblus he is eminently called the *greateſt of the gods*. Theſe found out how to make courts about mens houſes, and fences, and caves, or cellars. Huſbandmen, and ſuch as uſe dogs in hunting, derive from theſe; and they are alſo called *Aleta* and *Titani*.

Of theſe were begotten *Amynus*, and *Magus*, who ſhewed men to conſtitute villages and flocks.

In theſe menſe age there was one *Eliu*, which imports in Greek *Hyſſiſtus* [the moſt high], and his wife was named *Beruth*, who dwelt about Byblus: and by him was begotten one *Epigeus*, or *Autochthon*, whom they afterwards called *Uranus* [heaven]; ſo that from him that element which is over us, by reaſon of its excellent beauty, is called *heaven*: and he had a ſiſter of the ſame parents, called *Ge*, [the earth]; and by reaſon of her beauty, the earth had her name given to it.

Hyſſiſtus, the father of theſe, dying in ſight with wild beaſts, was conſecrated, and his children offered ſacrifices and libations to him.—But *Uranus* taking the kingdom of his father, married his ſiſter *Ge*, and had by her four ſons; *Ilus*, who is called *Cronus* [or *Saturn*]; *Betylus*; *Dagon*, who is *Siton* or the god of corn; and *Atlas*: but by other wives *Uranus* had much iſſue.

ANTEGO. See ANTIGUA.

ANTEJURAMENTUM, by our anceſtors called *juramentum calumnia*, an oath which anciently both accuſer and accuſed were to take before any trial or purgation.—The accuſer was to ſwear that he would proſecute the criminal; and the accuſed to make oath, on the day he was to undergo the ordeal, that he was innocent of the crime charged againſt him.

ANTELOPE, in zoology. See CAPRA.

ATELUCAN, in eccleſiaſtical writers, is applied to things done in the night or before day. We find frequent mention of the atelucan aſſemblies (*Cetus atelucani*) of the ancient Chriſtians in times of perſecution for religious worſhip.

ANTEMURALE, in the ancient military art, denotes much the ſame with what the moderns call an *out-work*.

ANTENCLEMA, in oratory, is where the whole defence of the perſon accuſed turns on criminating the accuſer. Such is the defence of *Oreſtes*, or the oration for *Milo*: *Occiſus eſt, ſed latro. Exſectus, ſed raptor*.

ANTENNÆ, in the hiſtory of inſects, ſlender bo-

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dies with which nature has furniſhed the heads of theſe creatures, being the ſame with what in Engliſh are called *horns* or *feelers*.

ANTENOR, a Trojan prince, came into Italy, expelled the Egeanians on the river *Po*, and built the city of *Padua*, where his tomb is ſaid to be ſtill extant.

ANTEPAGMENTA, in the ancient architecture, the jambs of a door. They are alſo ornaments, or gar- niſhings, in carved work, of men, animals, &c. made either of wood or ſtone, and ſet on the architrave.

ANTEPENULTIMA, in grammar, the third ſyllable of a word from the end, or the laſt ſyllable but two.

ANTEPILANI, in the Roman armies, a name given to the haſtati and principes, becauſe they marched next before the triarii, who were called *pilani*.

ANTEPILEPTICS, among phyſicians, medicines eſteemed good in the epilepsy.

ANTEPOSITION, a grammatical figure, where- by a word, which by the ordinary rules of ſyntax ought to follow another, comes before it. As when, in the Latin, the adjective is put before the ſubſtantive, the verb before the nominative caſe, &c.

ANTEPREDICAMENTS, among logicians, certain preliminary queſtions which illuſtrate the doctrine of predicaments and categories.

ANTEQUIERA, a handſome town of Spain, in the kingdom of *Granada*, divided into two parts, the upper and lower. The upper is ſeated on a hill, and has a caſtle: the lower ſtands in a fertile plain, and is watered with a great number of brooks. There is a large quantity of ſalt in the mountain; and five miles from the town, a ſpring famous for the cure of the gravel. W. Long. 4. 40. N. Lat. 36. 51.

ANTERIOR, denotes ſomething placed before another, either with reſpect to time or place.

ANTESIGNANI, in the Roman armies, ſoldiers placed before the ſtandards, in order to defend them, according to *Limpius*; but *Cæſar* and *Livy* mention the antesignani as the firſt line, or firſt body, of heavy- armed troops. The velites, who uſed to ſkirmiſh before the army, were likewiſe called antesignani.

ANTESTATURE, in fortification, a ſmall re- trenchment made of palifadoes, or ſacks of earth, with a view to diſpute with an enemy the remainder of a piece of ground.

ANTÉVIRGILIAN HUSBANDRY, an appellation given to Mr *Tull*'s new method of horſe-hoeing huſ- bandry. See AGRICULTURE, n° 171, &c.

ANTHELIX, in anatomy, the inward protuberance of the external ear, being a ſemicircle within, and almoſt parallel to the helix. See ANATOMY, n° 405.

ANTHELMINTICS, among phyſicians, medi- cines proper to deſtroy worms.

ANTHEM, a church-ſong performed in cathedral- ſervice by choiſters, who ſing alternately. It was uſed to denote both pſalms and hymns, when performed in this manner. But, at preſent, anthem is uſed in a more confined ſenſe, being applied to certain paſſages taken out of the ſcriptures, and adapted to a particular ſolemnity.

ANTHEMIS, CAMOMILE, a genus of the polyga- mia ſuperflua order, belonging to the ſyngeneſia claſs of plants. Of this genus *Linneus* enumerates 17

Species. But the moſt remarkable are the following.

O o o

1. The

Anthemis.

1. The nobilis, or common camomile, grows in plenty upon commons, and other waste land. It is a trailing perennial plant, which puts out roots from the branches, by which it spreads and multiplies greatly. Of this kind there is a variety with double leaves.—Formerly this plant was used for planting of walks, which, when mowed and rolled, looked well for some time; but as it was subject to decay in large patches, the walks became unsightly, and this was therefore disused.

2. The pyrethrum, or pellitory of Spain, is a perennial plant, which grows naturally in Spain and Portugal, from whence the roots are brought to Britain. The branches trail upon the ground, and spread a foot or more each way; these are garnished with fine winged leaves like those of the common camomile. At the extremity of each branch is produced one large single flower, like camomile, but much larger; the rays of which are of a pure white within, but purple on the outside. After the flowers are past, the receptacle swells to a large scaly cone, having the seeds lodged between its scales; but unless the season is dry, the seeds will not come to perfection in this country. 3. The tinctoria, with fawed winged leaves, is a perennial plant, which flowers from June to November, and makes a very pretty appearance, some of the flowers being of a white, others of a sulphur, and some of a bright yellow colour. 4. The Arabica, with a branching empalement. The seeds of this species were brought from Africa by the late Dr Shaw, and distributed to many curious botanists in this and other countries of Europe. It grows near two feet high, with an upright stem, having a single flower at the top, from whose empalement there are two or three foot-stalks put out horizontally, about two inches long, each having a single flower smaller than the first, like the childing marigold, or hen-and-chicken daisy.

Culture. The first sort may be very easily propagated by procuring a few slips in the spring, and planting them about a foot distant from one another, where they will soon cover the ground. The other sorts may be propagated from seeds sown in the spring, and will require no other care than to be kept free from weeds; only the third sort must be transplanted when come up from the seeds into borders near shrubs, where they may have room to grow; for they spread very wide, and therefore require to be placed three feet distant from other plants.

Medicinal Uses. The first and second sorts are used in medicine. The first have a strong, not ungrateful, aromatic smell, and a very bitter nauseous taste. They are accounted carminative, aperient, emollient, and in some measure anodyne; and stand recommended in flatulent colics, for promoting the uterine purgations, in spasmodic pains, and the pains of childbed-women: sometimes they have been employed in intermittent fevers, and the nephritis. These flowers are frequently also used externally in discutient and antiseptic fomentations, and in emollient glysters:—The root of the pyrethrum is the only part endowed with medical virtue. It has no sensible smell; its taste is very hot and acrid, but less so than that of arum or dracunculus: the juice expressed from it has scarce any acrimony, nor is the root itself so pungent when fresh as after it has been dried. Water, asslified by beat, extracts some share of its taste, rectified spirit

the whole; neither of them elevate any thing in distillation. The principal use of pyrethrum in the present practice is as a masticatory, for promoting the salival flux, and evacuating viscid humours from the head and neighbouring parts; by this means it often relieves the tooth-ach, some kinds of pains of the head, and lethargic complaints.

ANTHEREA, among botanists, that part of the stamen which is fixed on the top of the filamentum, within the corolla: it contains the pollen or fine dust, which, when mature, it emits for the impregnation of the plant according to Linnaeus. The *Apex* of Ray, Tournefort & Rivin.; *Capsula staminis*, of Malpighi.

ANTHERICUM, SPIDER-WORT; a genus of the monogynia order, belonging to the hexandria class of plants. Of this genus Linnaeus reckons up nine

Species. But only the three following seem to deserve notice. 1. The *ramosum*, with a branching stalk. 2. The *liliago*. These are perennial plants, which are natives of Spain, Portugal, and other warm countries. They were formerly pretty common in the English gardens; but the severe winter of 1740 killed most of their roots. They flower in June and July, and the seeds are ripe in September. 3. The *frutescens*, with a shrubby stalk, was formerly known among the gardeners near London by the name of *onion-leaved aloe*. It produces many ligneous branches from the root, each supporting a plant with long taper leaves, in shape like those of an onion, and full of a yellow pulp very juicy. These plants send out roots, which run down and fasten themselves into the earth, by which they multiply greatly. The flowers are produced on long loose spikes, are yellow, and appear at different times, so that the plants are never long destitute of flowers. This species is a native of the Cape of Good Hope.

Culture. The two first are propagated by seeds, which should be sown in the autumn, in a warm situation, on a bed of light sandy earth. When the plants come up they must be kept clear of weeds during the summer; and in autumn, when the leaves decay, they should be carefully taken up and transplanted into a bed of light earth, at a foot distance from one another. If the winter prove severe, they should be covered with straw, pease-haulm, or old tan. The third likewise requires shelter in winter; though some of them will live in the open air, if planted close to the warm wall.

ANTHESPHORIA, in antiquity, a Sicilian festival instituted in honour of Proserpine. The word is derived from the Greek *ανθος*, flower, and *σφοδρα*, I carry; because that goddess was forced away by Pluto when she was gathering flowers in the fields. Yet Festus does not ascribe the feast to Proserpine; but says it was thus called by reason ears of corn were carried on this day to the temples.—Anthesphoria seems to be the same thing with the *floriferum* of the Latins, and answers to the harvest-home among us.

ANTHESTERIA, in antiquity, was a feast celebrated by the Athenians in honour of Bacchus. The most natural derivation of the word is from the Greek *ανθος* (flor), a flower, it being the custom at this feast to offer garlands of flowers to Bacchus.

The anthesteria lasted three days, the 11th, 12th and 13th of the month; each of which had a name suited to the proper office of the day. The first day of the feast was called *ανισχυρια*, i. e. opening of the vessels; because

Anthera

Antheria

because on this day they tapped the vessels, and tasted the wine. The second day they called *x^{ves}, congi*, the name of a measure containing the weight of ten pounds; on this they drank the wine prepared the day before. The third day they called *x^{ipes}, kettles*: on this day they boiled all sorts of pulse in kettles; which however they were not allowed to taste, as being offered to Mercury.

ANTHESTERION, in ancient chronology, the sixth month of the Athenian year. It contained 29 days; and answered to the latter part of our November, and beginning of December. The Macedonians called it *desion* or *desion*. It had its name from the festival anthesteria kept in it.

ANTHOCEROS, or HORN-FLOWER, a genus of the order of alge, belonging to the cryptogamia class of plants. The calix of the male is sessile, cylindrical, and entire; the antheræ are very long, subulated, and two-valved; the calix of the female is divided into six pieces; the seeds are three. There are only three species of the anthoceros, viz. the punctatus or spotted anthoceros, a native of Britain; the levis, a native of Europe and America; and the multifidus, a native of Germany. It is found in moist shady places, and on heaths.

ANTHOLOGION, the title of the service-book used in the Greek church. It is divided into 12 months, containing the offices sung throughout the year, on the festivals of our Saviour, the Virgin, and other remarkable fairs.

ANTHOLOGY, a discourse of flowers, or of beautiful passages from any authors.—It is also the name given to a collection of epigrams taken from several Greek poets.

ANTHOLYZA, a genus of the monogynia order, belonging to the triandria class of plants, for which there is no English name.

Species. 1. The ringens, whose flower-slips spread asunder. This hath red, round, bulbous roots, from which arise several rough furrowed leaves, near a foot long, and half an inch broad: between these comes out the flower-stalk immediately from the root, which rises two feet high, is hairy, and hath several red flowers coming out on each side. These appear in June, and the seeds ripen in September. 2. The spicata, with narrow furrowed leaves, is in shape and size like the vernal crocus, but the outer skin is thin and white; from this arise five or six long narrow leaves, which are deeply furrowed. Between these arise the flower-stem, which is a foot and an half high, bending on one side towards the top, where the flowers come out on one side, standing erect. They are of a white colour, appear in May, and the seeds ripen in August. Both these species are natives of Africa, from whence their seeds were first obtained, and raised in the Dutch gardens.

Culture. The antholyza may be propagated by offsets, which it sends off in pretty great plenty; or by seeds, which are sometimes perfected in Europe. These should be sown soon after they are ripe, in pots of light earth; which, if plunged in an old bed of tan which has lost its heat, and shaded in the middle of the day in hot weather, they will come up the following winter: therefore they must be kept covered with glasses to screen them from cold, otherwise the young plants

will be destroyed. They may remain in the pots two years, if the plants are not too close, when they will have acquired strength enough to bear transplanting; the proper time for which is in July and August, when their leaves are decayed. In summer the pots may be placed in the open air, but in winter they must be placed under a hot-bed frame.

ANTHONY (St), was born in Egypt in 251, and inherited a large fortune, which he distributed among his neighbours and the poor, retired into solitude, founded a religious order, built many monasteries, and died anno 356. Many ridiculous stories are told, of his conflicts with the devil, and of his miracles: there are seven epistles extant, attributed to him.

ANTHONY, or *Knights of St ANTHONY*, a military order, instituted by Albert duke of Bavaria, Holland, and Zealand, when he designed to make war against the Turks in 1382. The knights wore a collar of gold made in form of a hermit's girdle, from which hung a stick cut like a crutch, with a little bell, as they are represented in St Anthony's pictures.

St ANTHONY also gives the denomination to an order of religious founded in France about the year 1095, to take care of those afflicted with *St Anthony's fire*: (see the next article).—It is said, that, in some places, these monks assume to themselves a power of giving, as well as removing, the *ignis sacer*, or erysipelas; a power which stands them in great stead for keeping the poor people in subjection, and extorting alms. To avoid the menaces of these monks, the country people present them every year with a fat hog a-piece. Some prelates endeavoured to persuade pope Paul III. to abolish the order; *quesuarios istos sancti Anthonii, qui decipiunt rusticos & simplices, eosque innumeris superstitionibus implicant, de medio tollendos esse*. But they subsist, notwithstanding, to this day in several places.

St ANTHONY'S FIRE, a name popularly given to the erysipelas.—Apparently it took this denomination, as those afflicted with it made their peculiar application to St Anthony of Padua for cure. It is known, that anciently particular diseases had their peculiar saints: thus, in the ophthalmia, persons had recourse to St Lucia; in the tooth-ach, to St Apollonia; in the hydrophobia, to St Hubert, &c. In effect, the Romanists in some parts are still said to represent St Anthony with a fire kindled at his side, to signify that he delivers people from the *sacer ignis* or erysipelas. They also paint a hog near him, as a token that he cures beasts of all diseases. To do him the greater honour in several places, they keep at common charges a hog denominated *St Anthony's hog*, for which they have great veneration. Some will have St Anthony's picture on the walls of their houses, hoping by that to be preserved from the plague; and the Italians, who do not know the true signification of the fire painted at the side of their saint, concluding that he preserves houses from being burnt, invoke him on such occasions.

ANTHORA, in botany, the trivial name of a species of aconitum. See ACONITUM.

ANTHORISMUS, in rhetoric, denotes a contrary description or definition of a thing from that given by the adverse party.—Thus, if the plaintiff urge, that to take any thing away from another without his knowledge or consent, is a theft; this is called *negus*, or definition. If the defendant reply, that to take a thing a-
way

Anthroper-
mum
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Anthropo-
morphim.

way from another without his knowledge or consent, provided it be done with design to return it to him again, is not theft; this is an *Anthropopoeia*.

ANTHOSPERMUM, the AMBER-TREE; a genus of the diœcia order, belonging to the polygamia class of plants.

Species. Of this genus Dr Linneus mentions two, the *Æthiopicum* and *ciliare*; but the first is most generally known in the gardens of the curious. Its beauty consists in its small evergreen leaves, which grow as close as heath. These being bruised between the fingers emit a very fragrant odour.

Culture. This plant is easily propagated, by cuttings, during any of the summer months, in a border of light earth; where they will take root in six weeks time, provided they are watered or shaded as the season may require; or if they are planted in pots plunged in a moderate hot-bed, they will take root the sooner, and there will be a greater certainty of their growing. They must be frequently renewed by cuttings, as the old plants are very subject to decay, and seldom last above three or four years.

ANTHOXANTHUM, or VERNAL-GRASS; a genus of the digynia order, belonging to the diandria class of plants, is one of the earliest spring grasses, and is extremely common in our fertile pastures. The delightful smell of new-mown hay is chiefly from this plant. Cows, horses, sheep, and goats eat it.

ANTHRACIS, **ANTHRACIAS**, or **ANTHRACITIS**, names promiscuously used by ancient naturalists for very different fossils, *viz.* the carbuncle, hematites, and a kind of asteria. See **CARBUNCLE**, &c.

ANTHRACOSIS, in medicine, a corrosive scaly ulcer, either in the bulb of the eye or the eye-lids.

ANTHRAX, a Greek term, literally signifying a burning coal, used by the ancients to denote a gem, as well as a disease, more generally known by the name of *carbuncle*.

ANTHRAX is sometimes also used for lithanthrax, or pit-coal. See **LITHANTHRAX**.

ANTHROPOGLOTTUS, among zoologists, an appellation given to such animals as have tongues resembling that of mankind, particularly to the parrot kind.

ANTHROPOGRAPHY, denotes the description of the human body, its parts, structure, &c.*

ANTHROPOLATREÏE, in church-history, an appellation given to the Nestorians, on account of their worshipping Christ, notwithstanding that they believed him to be a mere man.

ANTHROPOLATRIA, the paying divine honours to a man; supposed to be the most ancient kind of idolatry.

ANTHROPOLOGY, a discourse upon human nature.

ANTHROPOLOGY, among divines, denotes that manner of expression by which the inspired writers attribute human parts and passions to God.

ANTHROPOMANCY, a species of divination, performed by inspecting the entrails of a human creature.

ANTHROPOMORPHIA, a term formerly given to the primates of that class of animals which have the greatest resemblance to the human kind*.

ANTHROPOMORHISM, among ecclesiastical

writers, denotes the heresy or error of the Anthropomorphites. See the next article.

ANTHROPOMORPHITES, in church-history, a sect of ancient heretics, who taking every thing spoken of God in scripture in a literal sense, particularly that passage of Genesis in which it is said *God made man after his own image*, maintained, That God had a human shape. They are likewise called *Audens*, from *Audens* their leader.

ANTHROPOMORPHOUS, an appellation given to whatever resembles the human form.

ANTHROPOPATHY, a figure or expression by which some passion is ascribed to God, which properly belongs only to man.

ANTHROPOSCOPY, that part of physiognomy which judges of a man's character, &c. from the lineaments of his body.—Otto published an *Anthroposcopia, sive judicium hominis de homine ex lineamentis externis*. Regiom. 1647. 4to.

ANTHROPOPHAGI, (of *ανθρωπος* a man, and *φαγω* to eat), MEN-EATERS. That there have been, in almost all ages of the world, nations who have followed this barbarous practice, we have abundance of testimonies. According to Herodotus, among the Etesdonian Scythians, when a man's father died, the neighbours brought several beasts, which they killed, mixed up their flesh with that of the deceased, and made a feast. Among the Massagetz, when any person grew old, they killed him and eat his flesh; but if he died of sickness, they buried him, esteeming him unhappy. The same author also assures us, that several nations in the Indies killed all their old people and their sick, to feed on their flesh: he adds, that persons in health were sometimes accused of being sick, to afford a pretence for devouring them. According to Sextus Empiricus, the first laws that were made, were for the prevention of this barbarous practice, which the Greek writers represent as universal before the time of Orpheus.

Of the practice of anthropophagy in latter times, we have the testimonies of all the Romish missionaries who have visited the internal parts of Africa, and even some parts of Asia. Herrera speaks of great markets in China, furnished wholly with human flesh, for the better sort of people. Marcus Paulus speaks of the like in his time, in the kingdom of Concha towards Quinsay, and the island of Zapengit; others, of the great Java; Barbosa, of the kingdom of Siam and island of Sumatra; others, of the islands in the Gulf of Bengal, of the country of the Samogitians, &c.

When America was discovered, this practice was found to be almost universal, inasmuch that several authors have supposed it to be occasioned through a want of other food, or through the indolence of the people to seek for it: but this Dr Robertson denies; and ascribes the origin of such a barbarous custom to its most probable cause, *viz.* an implacable spirit of revenge.

Notwithstanding all these testimonies, however, the existence of anthropophagy has been denied by many, and much argumentation *pro* and *con* has been carried on; but Mr Forster, in his account of Captain Cook's voyage, hath given us such a testimony, as we imagine will convince the most sceptical. This gentleman hath assured us, that not only he, but the whole ship's crew, who were called upon deck for that purpose, saw some New Zealanders eat a piece of human flesh roast-

Anthropo-
morphites
||
Anthropo-
phagi.

* See *Antro-
pomy*.

* See *Zoo-
logy*.

Anthropo-
thysia

Anthyllus.

ed, with a ravenous appetite; and that they affirmed its taste to be exceedingly delicious. See *New Zealand*.

The philosophers Diogenes, Chrypsippus, and Zeno, followed by the whole sect of Stoics, affirmed that there was nothing unnatural in the eating of human flesh; and that it was very reasonable to use dead bodies for food, rather than give them a prey to worms and putrefaction. In order to make the trial, however, whether there was any real repugnancy in nature to the feeding of an animal with the flesh of its own species, Leonardus Florentinus fed a hog with hog's flesh, and a dog with dog's flesh; upon which he found the bristles of the hog to fall off, and the dog to become full of ulcers.—To the custom of eating human flesh the origin of the venereal disease hath been ascribed; and not without great probability, as it is found to exist in all those places where such barbarity is practised.

ANTHROPOTHYSIA, the inhuman practice of offering human sacrifices. See *SACRIFICE*.

ANTHUS, in ornithology, a synonyme of the louse. See *LOSEIA*.

ANTHYLLIS, **KIDNEY-WETCH**, a genus of the decandria order, belonging to the diadelphia class of plants.

Species. Dr Linnæus enumerates nine species of anthyllis; of which, the following seem to be most worthy of attention. 1. The vulneraria, with unequal winged leaves, is a native of Spain and Portugal, as likewise of Wales. It is a biennial plant, having single leaves at bottom, which are oval and hairy; but those which grow out of the stalks are winged, each being composed of two or three pair of lobes terminated by an odd one. The flowers grow collected into heads at the top of the stalks, are of a bright scarlet colour, and make a pretty appearance. It flowers in June and July, and the seeds ripen in October. 2. The montana or herbaceous woundwort, with winged leaves, grows naturally in the mountains in the south of France, and in Italy. It is garnished with winged leaves, which have an equal number of hairy lobes at the extremity of the branches. The flowers are produced in heads, and are of a purple colour and globular form. They appear in June and July, and the seeds ripen in October. 3. The barba-jovis, or silver-bush, has its name from the whiteness of its leaves. This is a shrub which often grows to the height of ten or twelve feet, dividing into many lateral branches, garnished with winged leaves composed of an equal number of narrow lobes, which are very white and hairy: the flowers are produced at the extremities of the branches, collected into small heads; these are of a bright yellow colour, and appear in June; sometimes they are succeeded by short woolly pods, containing two or three kidney-shaped seeds: but unless the season proves warm, they do not ripen in this country. 4. The cytoides, or shrubby woundwort, has long been known in the English gardens. It is a low shrub, seldom rising above two feet high, but sends out many slender branches, garnished with hoary leaves, which are sometimes single, but generally have three oval lobes, the middle being longer than the other two: the flowers are yellow, and come out from the sides of the branches, three or four joined together, having woolly impalements; but these are rarely succeeded by seeds in England.

Culture. The first and second roots require no par-

ticular management further than being kept free from weeds. The third and fourth may be propagated by cuttings planted during any of the summer months; observing to shade and water them till they have taken good root; when they are to be transplanted into pots, and must always be housed in winter.

ANTHYPOPHORA, in rhetoric, a figure of speech; being the counter-part of an hypophora. See *HYPOPHORA*.

ANTI, a Greek preposition, which enters into the composition of several words, both Latin, French, and English, in different senses. Sometimes it signifies *before*, as in anti-chamber; and sometimes *opposite* or *contrary*, as in the names of these medicines, anti-scorbutic, anti-venereal.

ANTIBACCHIIUS, in ancient poetry, a foot consisting of three syllables, the two first long, and the last one short: such is the word *ambire*.

ANTIBES, a sea-port town of Provence in France, with a strong castle. Its territory produces excellent fruit; and the town stands opposite to Nice, in the Mediterranean. E. Long. 7. 5. N. Lat. 43. 35.

ANTICHAMBER, an outer chamber for strangers to wait in, till the person to be spoken with is at leisure.

ANTICHRIST, among ecclesiastical writers, denotes a great adversary of Christianity, who is to appear upon the earth towards the end of the world. He is called in scripture, *The man of sin, the man of perdition*, &c.

We have demonstrations, disputations, and proofs, in great order and number, both that the pope is, and that he is not, Antichrist.

F. Calmet is very large in describing the father and mother of Antichrist, his tribe and pedigree, his wars and conquests, his achievements against Gog, Magog, &c.

Some place his capital at Constantinople, others at Jerusalem, others at Moscow, and some few at London; but the generality at Rome, though these last are divided. Grotius and some others suppose Rome Pagan to have been the seat of Antichrist: most of the Lutheran and reformed doctors contend earnestly for Rome Christian under the papal hierarchy.

M. Le Clerc holds, that the rebel Jews and their leader Simon, whose history is given by Josephus, are to be reputed as the true Antichrist. Lightfoot and Vanderhart rather apply this character to the Jewish Sanhedrim. Hippolitus and others held that the devil himself was the true Antichrist; that he was to be incarnate, and make his appearance in human shape before the consummation of all things. Others among the ancients held that Antichrist was to be born of a virgin, by some prolific power imparted to her by the devil. A modern writer * of the female sex, whom many hold for a saint, has improved on this sentiment; maintaining that Antichrist is to be begotten by the devil on the body of a witch by means of the semen of a man caught in the commission of a certain crime, and conveyed, &c.

How endless are conjectures? Some of the Jews, we are told, actually took Cromwell for the Christ; while some others have laboured to prove him Antichrist himself. Pfaffius assures us he saw a folio book in the Bodleian library, written on purpose to demonstrate this

Anthypo-
phora
Antichrist.

* Bayle's
Dictionary
voce *Bou-
rignon*.

Antichrist this latter position.

Anticus.

Hunnus and some others, to secure Antichrist to the pope, (notwithstanding that this latter seemed excluded by not being of the tribe of Dan), have broke in upon the unity of Antichrist, and assert that there is to be both an eastern and a western Antichrist.

Father Malvenda, a Jesuit, hath published a large work intitled *Antichristo*, in which this subject is amply discussed. It consists of thirteen books. In the first, he relates all the opinions of the fathers with regard to Antichrist. In the second, he speaks of the times when he shall appear; and shews, that all the fathers who supposed Antichrist to be near at hand, judged the world was near its period. In the third, he discourses of his origin and nation; and shews that he is to be a Jew, of the tribe of Dan: this he founds on the authority of the fathers; on the passage in Genesis xlix. 17. *Dan shall be a serpent by the way*, &c.; on that of Jeremy viii. 16. where it is said, *The armies of Dan shall devour the earth*; and on Rev. vii. where St John, enumerating all the tribes of Israel, makes no mention of that of Dan. In the fourth and fifth books, he treats of the signs of Antichrist. In the sixth, of his reign and wars. In the seventh, of his vices. In the eighth, of his doctrine and miracles. In the ninth, of his persecutions; and in the rest, of the coming of Enoch and Elias, the conversion of the Jews, the reign of Jesus Christ, and the death of Antichrist, after he has reigned three years and an half. See also *Lowman on the Revelation*.

ANTICHRISTIANISM, a state or quality in persons or principles, which denominates them antichristian, or opposite to the kingdom of Christ.

M. Jurieu takes the idea of the unity of the church to have been the source of *Antichristianism*. Had not mankind been infatuated with this, they would never have stood in such awe of the anathema's of Rome. It is on this the popes erected their monarchical power.

ANTICHRISTIANS properly denote the followers or worshippers of Antichrist.

ANTICHRISTIANS are more particularly understood of those who set up or believe a false Christ, or Messiah.

ANTICHTHONES, in ancient geography, an appellation given to the inhabitants of opposite hemispheres.

ANTICIRRHA, (Strabo); ANTICYRA, (Pausanias, Stephanus, Livy); a town in Phocis, on the Corinthian bay, opposite to Cirrha, lying to the west on the same bay. Another *Anticirra*, or *Anticyra*, on the Sinus Maliacus, and near mount Oeta, where grew the best hellebore, (Strabo, Stephanus;) but which Pausanias ascribes to the *Anticyra* of Phocis: Hence the adage, *Naviget Anticyram*, (Horace,) used of a person of an unsound mind. The gentilistic name is *Anticyreus*, (Pausanias.)

ANTICOR, or ANTICŒUR, among farriers, an inflammation in a horse's throat, being the same with the quincy in mankind. See *FARRIERY*, xxxvii. 2.

ANTICOSTE, a barren island lying in the mouth of the river St Laurence, in North America. W. Long. 64. 16. N. Lat. from 49. to 53.

ANTICUS, a term used by anatomists, importing, that the part with which it is joined stands before some others: Thus, we meet with *ferratus anticus*, *peroneus*

anticus.

ANTIDESMA, in botany, a genus of the diccra order, belonging to the pentandria class of plants. The calix of the male consists of five leaves; it has no corolla: The calix of the female is entire, gaping a little on one side; it has no corolla, but two styli, and a double-valved capsule inclosed in the calix. There is but one species of the antidesma, viz. the alexteria, a native of India.

ANTIDICOMARIANITES, ancient heretics, who pretended that the holy virgin did not preserve a perpetual virginity, but that she had several children by Joseph after our Saviour's birth.—Their opinion was grounded on some expressions of our Saviour, wherein he mentions his brothers and his sisters; and of St Matthew, where he says, that Joseph knew not Mary till she had brought forth her first-born son. The Antidicomarianites were the disciples of Helvidius and Jovinian, who appeared in Rome toward the close of the fourth century.

ANTIDOSIS, in antiquity, denotes an exchange of estates, practised by the Greeks on certain occasions with peculiar ceremonies, and first instituted by Solon.

When a person was nominated to an office, the expense of which he was not able to support, he had recourse to the antidosis; that is, he was to seek some other citizen of better substance than himself, who was free from this, and other offices; in which case the former was excused. In case the person thus substituted denied himself to be the richest, they were to exchange estates, after this manner: the doors of their houses were close shut up and sealed, that nothing might be conveyed away; then both took an oath to make a faithful discovery of all their effects, except what lay in the silver-mines, which by the laws was excused from all imposts; accordingly, within three days, a full discovery and exchange of estates was made.

ANTIDOTE, among physicians, a remedy taken to prevent, or to cure the effects of poison, &c.

ANTIENŒT. See ANCIENT.

ANTIGONUS, one of Alexander's commanders, to whom Asia fell. He conquered Eumenes, and expelled Seleucus out of Syria; who flying to Ptolemy Lagus in Egypt, a bloody war commenced betwixt him, Cassander, and Antigonus, wherein, by the help of his son Demetrius, Antigonus prevailed, and built the city Antigonía, anno Romæ 448. Afterward Cassander, Seleucus, and Lyfimachus, uniting against him, routed him, in league with king Pyrrhus, and slew him near Epirus, 301 years before Christ.

ANTIGONUS, king of the Jews, was the son of Aristobulus. He entered into an alliance with the king of the Parthians, and besieged Jerusalem. He cut off his uncle Hircanus's ears, to incapacitate him for the high-priesthood; and put Josephus, Herod's brother, to death. At length, Herod took him and sent him to M. Anthony; who, to gratify Herod, cut off his head, and thereby extinguished the Asmoneans, who had reigned 126 years. This happened 36 years before Christ.

ANTIGUA, one of the Antilles or Caribbee islands, belonging to the English, and situated in about W. Long. 62. N. Lat. 17. 30. It is above 50 miles in circumference, and is reckoned the largest of all the British Leeward islands. This island was long thought

Antidesma
||
Antiguæ.

Antigua.

Antigua.

to be uninhabitable, because of its being destitute of fresh water; but this loss was supplied by the industry of the inhabitants, who have discovered some springs, and made reservoirs for preserving the rain water. It is the best provided with harbours of all the Leeward islands; but the approach to it is dangerous to any but skilful pilots, on account of the vast number of rocks with which it is surrounded. One of those is called *Five-isle-harbour*; and, though difficult of access, is often of great service to ships in distress. St John's harbour, which lies due north, would be the best in the whole island, were it not for a sandy bar that runs across it. At the mouth of St John's river, is a fort, which is mounted with 14 cannon; and several batteries, mounting in the whole 26 guns, are raised for the defence of as many landing-places. None-such harbour lies on the west side of the island, in a spacious bay. Willoughby bay is almost a league over at the mouth; but is above two thirds blocked up with a shoal stretching from the north to the south point; from whence lies Sandy-point, with an island in it; but between the north and south point there is an open channel where ships may enter, and, when entered, may have good riding. But the most convenient harbour in Antigua, or perhaps in the West Indies, is English-harbour; which is proper for careening ships of war, and might be improved in such a manner as to admit those of the greatest burthen. At the bottom of Falmouth harbour, lies Falmouth town, which is defended by Fort-Charles, and Monkhill Fort. The latter contains a magazine of 410 muskets and 800 bayonets, and is mounted with 30 pieces of cannon.

The climate of Antigua is very hot, and so liable to hurricanes, that were it not for the great conveniency of its situation and harbours, it must have lain a mere desert. Wild cinnamon grows in the low lands; and this island is generally said to have greater plenty of venison upon it than any other of the Caribbees; besides its producing abundance of fowl, and black cattle. Its chief commodities are sugar and tobacco; but the inhabitants formerly cultivated indigo and pepper. The annual export of sugar from this island is computed to be 16,000 hogheads; but the inhabitants do not make rum in proportion.

Antigua was very early planted by some English adventurers, whose history is now uncertain. According to some French writers, the English, so far back as the year 1640, were very numerous, inasmuch that they gave offence to the native Caribbees, who had probably received them kindly at first. The event of the quarrel was, that the natives killed fifty of the English, and carried off the governor's lady. Long after this the island was inhabited both by French and English, who lived together with great cordiality; but the former were at last treated with such severity, because they hesitated at swearing allegiance to the English government, that they were forced to retire to Guadalupe. Those exiles immediately disclosed to their countrymen the weak state of the English colony, and how easily it might be reduced; upon which an expedition was immediately undertaken. The English were besieged in form, their forts taken, their governor made prisoner, and they themselves obliged to accept of a capitulation for surrendering the whole island. Before this capitulation, however, could be put in ex-

écution, a reinforcement arrived, which prevented its taking place. The governors of the French Caribbees understanding this, mustered a greater force, and landing upon Antigua in 1667, the English governor, Fish, was obliged to ratify the treaty; the island was, however, restored to the English the following year, by an article of the treaty of Breda.

From this time, the colony of Antigua began to flourish, chiefly through the prudent management of colonel Christopher Codrington; who, having been appointed captain-general, and general-governor of all the Leeward islands, removed from Barbadoes to Antigua, which he made the seat of his government; and here, by his great knowledge and experience in West-India plantations, he introduced a new and better system of colonizing and improving. It was not in his power, however, to prevent the effects of those dreadful hurricanes to which the island is subject, and which more than once in his time rendered it a scene of desolation, particularly in 1681; and nine years after, it was almost entirely ruined by an earthquake.

The Indians, instigated by the French, never failed to avail themselves of those natural calamities by making descents upon the island; but after having plundered the plantations nearest the sea, they were generally driven off with loss. Sometimes, however, they made their descents with a force sufficient to carry off negroes and other prey. On these occasions the French privateers were partly manned with Irish Roman-catholics, whom the inhabitants found to be their most cruel enemies. To make themselves some amends for these depredations, the Antiguans made a descent upon the French island of Marigalante, where they took and burnt the chief town, demolished the fort and spiked up its guns, drove the inhabitants into the woods, and returned to Antigua laden with plunder.

Notwithstanding these skirmishes, the trade of Antigua continued to flourish, so that in 1696, eleven loaded ships were sent from the island at one time. This year died Colonel Codrington, and was succeeded by his son, of the same name and rank; and who had distinguished himself equally in arms, and in the polite arts. This gentleman very early formed a design of attacking the French West-India islands; and, having used his utmost endeavours to procure a sufficient armament for this purpose, as well as encouraged the merchants and planters to fit out privateers, to which he himself contributed largely, he made a descent upon Guadeloupe. Here he first dislodged the enemy from a post called *Le petits Habitans*, and having landed about 800 more men, they boldly marched up to a town called the *Bayliffe*, where the French had manned a breast-work, which they vigorously defended, and killed three English captains at the head of their grenadiers. But the English soldiers having briskly kept up their fire, at last laid the muzzles of their pieces across the top of the breast-work, and soon became masters of it. This was followed by the conquest of all the other breast-works, of the town of Bayliffe itself, and of the Jacobine church and plantation, both of which were strongly fortified. At last the main town of Bassé Terre was taken, and the French retired to the fort, leaving all the open country to be plundered and destroyed by the English. When now nothing remained to complete the conquest of the island, but the reduction of Bassé Terre

fort

Antigua
Antihæc-
ticum.

fort and castle, a disagreement arose between the sea and land officers, the particulars of which were so little to the credit of either, that they were never made public: the expedition, however, was abandoned, on pretence that the reduction of the island was a matter of much greater difficulty than had been foreseen; and that, considering the vigorous defence made by the French, the English army, which was now both weak and sickly, was unable to do duty any longer.

Colonel Codrington was succeeded, in 1704, by Sir William Matthews, and he by colonel Park, who received the government from the hands of John Yeomans, Esq; the president of the island, and of the council. All this time, notwithstanding the repeated attacks of the French upon the other West-India islands, Antigua remained unmolested; and the inhabitants grew rich by their privateering, in which they became so expert, that a French sloop with 50 men was taken, and 40 of her men killed by an English vessel having no more than nine men and six boys on board. The new governor began his administration in the most unpopular manner that can be conceived. He appointed a common foot-soldier to act as provost-marshal of the island; and that too without obliging him to give any security, which was highly necessary. When talked to upon this head, he refused to give any other answer than, that a foot-soldier was a gentleman. In other respects he behaved in a manner so unbecoming his station, that an impeachment of his conduct was transmitted to England by the principal inhabitants of the island, and he was in the end ordered home. With this command, however, he did not comply, but suffered a ship to sail without him, in which he ought to have returned to England. Upon this, the islanders began to look upon him as an usurper, and formed a design of taking him prisoner and sending him home by force. Park prepared for his defence against the islanders, who appeared in arms against him to the number of 400. He had garrisoned his house with all the regulars he found upon the island, and was attended by some of his worthless creatures whom he had raised to places of power and trust. He now sent his provost-marshal to the inhabitants, with a proclamation, requiring them to disperse; but this they despised, declaring that the governor's troops should not prevent him from being sent prisoner to England. The more moderate among them were for compromising matters, and Park himself now offered them very reasonable terms; but the greater part thinking that they had gone too far to retract, attacked the house, and having wounded the governor and then got him into their hands, murdered him in a shocking manner.

From this time, no very remarkable transactions have happened with regard to the island of Antigua. It hath continued unmolested in all the late wars with France. The number of white inhabitants is reckoned about 10,000. It is divided into five parishes; that of St John's-town, which is reckoned the capital of the north-west part, and consists of above 200 houses; those of Falmouth, Porham, and Bridge-town, on the south-side; and St Peter's, which is no town, but lies almost in the middle of the island.

ANTIHECTICS, in pharmacy, medicines good in hectic disorders.

ANTIHECTICUM POTERII, the name of a me-

dicine formerly much celebrated, but now laid aside in common practice.

ANTILLES, the French name for the Caribbee lands.

ANTILOGARITHM, the complement of the logarithm of a sine, tangent, or secant; or the difference of that logarithm from the logarithm of 90 degrees.

ANTIOLOGY, in matters of literature, an inconsistency between two or more passages of the same book.

ANTILYSSUS PULVIS. See PHARMACY, n° 807.

ANTIMERIA, in grammar, a figure whereby one part of speech is used for another: e. gr. *velle suum cuique est*, for, *voluntas sua cuique est*; also, *populus late rex*, for *populus late regnans*.

ANTIMERIA, in a more restrained sense, is a figure where the noun is repeated instead of the pronoun. The antimeria is frequent in the Hebrew, and is sometimes retained in our version of the Old Testament accordingly: e. gr. *Hear my voice, ye wives of Lamech, for my wives*, Gen. iv. 23.

ANTIMETABOLE, in rhetoric, a figure which sets two things in opposition to each other. The word is Greek, compounded of *αντι*, against, and *μεταβολη* from *μεταβαλλω*, I shift or transfer; i. e. a shifting, or setting two things over-against each other. This figure is twice exemplified in an apophthegm of Musonius; which, on account of its excellence, is called *aurum montium*, the golden maxim or precept.

ANTIMONARCHICAL, an appellation given to whatever opposes monarchical government.

ANTIMONIALS, in medicine, preparations of antimony. See the references at MAT. MED. n° 110.

ANTIMONY, a blackish mineral substance, staining the hands, full of long, shining, needle-like fibres, hard, brittle, and considerably heavy. It is found in different parts of Europe, as Bohemia, Saxony, Transylvania, Hungary, France and England; commonly in mines by itself, intermixed with earth and stony matters. Sometimes it is blended with the richer ores of silver, and renders the extraction of that metal difficult by volatilizing a part of the silver, or, in the language of the miners, *robbing the ore*.

This mineral is separated from its natural impurities by fusion in an earthen pot whose bottom is full of holes; the fluid antimony passing through, while the unfusible matters remain behind. The melting vessel is set into another pot sunk in the ground. This last, which is of a conical figure, and serves for a receiver, gives the shape to the leaves of antimony usually met with. The juncture of the two vessels is closely luted, the uppermost one covered, and a fire made round it. In some places, instead of a pot with a perforated bottom, one is made use of which has no bottom, and a perforated iron plate is interposed betwixt it and the receiver. But the former method is preferable, as the antimony, while in fusion, is apt to dissolve some of the iron. Very little heat is necessary in this operation, for the antimony melts before it is red hot.

Medicinal Uses, &c. For a long time this mineral was esteemed poisonous. In 1566, its use was prohibited in France by an edict of parliament; and in 1609, one Bessier was expelled the faculty for having given it. The edict was repealed in 1650; antimony having a few years before been received into the number of purgatives. In 1668, a new edict came forth, for-

Antilles
Antimony.

Antiochia

Antioch.

Antioch.

forbidding its use by any but doctors of the faculty.—It is now universally allowed, that pure antimony in its crude state has no noxious quality; and that tho' many of its preparations are most virulently emetic and cathartic, yet, by a slight alteration or addition, they lose their virulence, and become mild in their operation. Antimony was used by the ancients in collyria against inflammations of the eyes, and for staining the eyebrows black. Its most efficacious preparations, are the regulus, glass, and liver*. Antimony is also made use of for purifying and heightening the colour of gold. See that article.

* See Chemistry, no 158, 11, 258, 49, 454, 159. Also he references at Materia Medica, p 110.

ANTINOEIA, in antiquity, annual sacrifices, and quinquennial games, in memory of Antinous the Bithynian. They were instituted at the command of Adrian the Roman emperor, at Mantinea in Arcadia, where Antinous was honoured with a temple and divine worship.

ANTINOMIANS, in ecclesiastical history, certain heretics who first appeared in the year 1535. The word is formed from the Greek, *anti* against, and *nomos* a law. They were so called, because they rejected the law as of no use under the gospel-dispensation. They held, that good works do not further, nor evil hinder, salvation; that the child of God cannot sin; that God never chastises any land for their sins; that murder, adultery, drunkenness, and the like, are no sins in the children of God; that an hypocrite may have all the graces that were in Adam before his fall; and the like strange opinions.

ANTINOUS, the favourite of Adrian, was born at Bithynus in Bithynia. His beauty engaged the heart of Adrian in such a manner, that there never was a more boundless and extravagant passion than that of this emperor toward this youth. After his death, the emperor ordered divine honours to be paid him.

ANTIOCH, a city of Syria in Asia, situated on the river Orontes, in E. Long. 37.5. N. Lat. 36. 20. It was built by Seleucus Nicator, founder of the Syro-Macedonian empire, who made it his capital. It stood on the above mentioned river, about 20 miles from the place where it empties itself into the Mediterranean; being equally distant from Constantinople and Alexandria in Egypt, that is, about 700 miles from each. Seleucus called it *Antioch*, from his father's name, according to some; or from that of his son, according to others. He built 16 other cities bearing the same name; of which one, situated in Pisidia, is probably that where the name of *Christians* was first given to the followers of Jesus Christ. But that situated on the Orontes, by far eclipsed, not only all the others of this name, but all the cities built by Seleucus. Antigonus, not long before, had founded a city in that neighbourhood, from his own name he had called *Antigonia*, and designed it for the capital of his empire; but it was raised to the ground by Seleucus, who employed the materials in building his metropolis, and also transplanted the inhabitants thither.

The city of Antioch was afterwards known by the name of *Tetrapolis*, being divided as it were into four cities, each of them being surrounded with its proper wall, besides a common one which inclosed them all. The first of these cities was built by Seleucus Nicator, as already mentioned; the second by those who flocked thither on its being made the capital of the Syro-

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Macedonian empire; the third by Seleucus Callinicus; and the fourth by Antiochus Epiphanes.—About four or five miles distant, stood a place called *Daphne*, which was nevertheless reckoned a suburb of Antioch. Here Seleucus planted a grove, and in the middle of it built a temple which he consecrated to Apollo and Diana, making the whole an asylum. To this place the inhabitants of Antioch resorted for their pleasures and diversions; whereby it became at last so infamous, that, "to live after the manner of Daphne," was used as a proverb to express the most voluptuous and dissolute way of living. Here Lucius Verus, the colleague of M. Aurelius, chose to take up his residence, instead of marching against the Parthians; while his general Cassius forbade by proclamation any of his soldiers to enter or even go near the place. In short, so remarkable was Daphne of old, that the metropolis itself was distinguished by it, and called *Antioch near Daphne*.

Though Antioch continued to be, as Pliny calls it, the queen of the east, for near 1600 years; yet scarce any city mentioned in history hath undergone such calamities, both from the attacks of its enemies, and its being naturally subjected to earthquakes.—The first disaster, mentioned in history, which befel the Antiochians, happened about 145 years before Christ. Being at that time very much disaffected to the person and government of Demetrius their king, they were continually raising tumults and seditions; inasmuch that he found himself at last obliged to solicit assistance from the Jews; and was furnished by Jonathan, one of the Maccabees, with 3000 men: by which reinforcement believing himself sufficiently strong to reduce the mutineers by force, he ordered them immediately to deliver up their arms. This unexpected order caused a great uproar in the city. The inhabitants ran to arms, and invested the king's palace, to the number of 120,000, with a design to put him to death. All the Jews halted to his relief, fell upon the rebels, killed 100,000 of them, and set fire to the city. On the destruction of the Syrian empire by the Romans, Antioch submitted to them as well as the other cities of that kingdom, and continued for a long time under their dominion. About the year 115, in the reign of the emperor Trajan, it was almost entirely ruined by one of the most dreadful earthquakes mentioned in history. Trajan himself happened to be there at that time, being returned from an expedition against the Parthians; so that the city was then full of troops, and strangers come from all quarters either out of curiosity or upon business and embassies: the calamity was by this means felt almost in every province of the Roman empire. The earthquake was preceded by violent claps of thunder, unusual winds, and a dreadful noise under ground. The shock was so terrible, that great numbers of houses were overturned, and others tossed to and fro like a ship at sea. Those who happened to be in their houses were for the most part buried under their ruins: those who were walking in the streets, or in the squares, were, by the violence of the shock, dashed against each other, and most of them either killed or dangerously wounded.—This earthquake continued, with some small intermission, for many days and nights; so that vast numbers perished. The most violent shock, according to the Acts of St Ignatius, was on a Sunday, December 23. By this Trajan was

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much

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much hurt, but escaped through a window. Dio Cassius pretends, that he was taken out of the window by one who exceeded the human size in tallness. The same historian adds, that mount Lison, which stood at a small distance from the city, bowed with its head and threatened to fall down upon it; that other mountains fell; that new rivers appeared; and others, that had flowed before, forsook their course and vanished. When the earthquake ceased, a woman was heard crying under the ruins; which being immediately removed, she was found, with a living child in her arms. Search was made for others; but none was found alive, except one child, which continued sucking its dead mother.

No doubt, Trajan, who was an eye-witness of this terrible calamity, would contribute largely towards the re-establishment of Antioch in its ancient splendor. Its good fortune, however, did not continue long; for in 155, it was almost entirely burnt by accidental fire; when it was again restored by Antoninus Pius. In 176 or 177, the inhabitants having sided with Cassius, the abovementioned Roman general, who had revolted from M. Aurelius, that emperor published a severe edict against them, deprived them of all their privileges, suppressed their public assemblies, and took from them the shows and spectacles to which they were greatly addicted: but his anger being soon appeased, he restored them to their former condition, and even condescended to visit their city. In 194, having sided with Niger against Severus, the latter deprived them of all their privileges, and subjected Antioch as a mere village to Laodicea; but, however, pardoned them the next year at the intreaties of his eldest son, then a child.

When the power of the Roman empire began to decline, Antioch became the bone of contention between them and the eastern nations; and accordingly, on the breaking out of a Persian war, it was almost always sure to suffer. In 242, it was taken and plundered by Sapor; and, though he was defeated by Gordian, it underwent the same misfortune in the time of Valerian, about 18 years after; and after the defeat and captivity of Valerian, being taken by the Persian monarch a third time, he not only plundered it, but levelled all the public buildings with the ground. The Persians, however, being soon driven out, this unfortunate city continued free from any remarkable calamity till about the time of the division of the Roman empire by Constantine in 331. It was then afflicted with so grievous a famine, that a bushel of wheat was sold for 400 pieces of silver. During this grievous distress, Constantine sent to the bishop 30,000 bushels of corn; besides an incredible quantity of all kinds of provisions, to be distributed among the ecclesiastics, widows, orphans, &c. In the year 347, Constantine II. caused an harbour to be made at Seleucia, for the convenience of Antioch. This was effected at an immense expence, the mouth of the Orontes, where the port was made, being full of sands and rocks. When the emperor Julian set out on his expedition against the Persians, he made a long stay at Antioch; during which time, many of the Roman provinces were afflicted with a famine, but which raged more violently at Antioch than in other places. The ecclesiastic writers of those times say, that this famine followed Julian from place to place; and as he continued longer at Antioch than any other city, it raged more violently there than any where else. To re-

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medy this evil, Julian fixed the prices of corn, by which means the famine was greatly increased, the merchants conveying their corn privately to other places, so that this metropolis was reduced to a most deplorable situation. In 381, in the reign of Theodosius the Great, Antioch was again visited by a famine, accompanied by a grievous plague. The latter soon ceased: but, the famine still continuing, the bishop, Libanius, applied to Icarus, count of the East, requesting him by some means or other to relieve the poor, who had flocked from all parts to the metropolis, and were daily perishing in great numbers; but to this Icarus gave no other answer, than that they were abhorred and justly punished by the gods. This inhuman answer raised great disturbances; which, however, were terminated without bloodshed. In 387, Theodosius finding his exchequer quite drained, and being obliged to be at an extraordinary expence in celebrating the fifth year of the reign of his son Arcadius, and the tenth of his own, an extraordinary tax was laid upon all the people in the empire. Most of the cities submitted willingly to this; but the people of Antioch, complaining of it as an unreasonable oppression, crowded to the house of Flavianus their bishop, as soon as the edict was published, to implore his protection. Being unable to find him, they returned to the forum; and would have torn the governor in pieces, had not the officers who attended him kept back with great difficulty the enraged multitude, till he made his escape. Upon this, they broke some of the emperor's statues and dragged others through the city, uttering the most injurious and abusive expressions against him and his whole family. They were, however, dispersed by a body of archers, who, by wounding only two of the rabble, struck terror into all the rest. The governor proceeded against the offenders with the utmost cruelty; exposing some to wild beasts in the theatre, and burning others alive. He did not spare even the children, who had insulted the emperor's statues; and caused several persons to be executed, who had been only spectators of the disorder. In the mean time, a report was spread, that a body of troops was at hand, with orders to plunder the city, and put all to the sword, without distinction of sex or age; upon which, the citizens abandoned their dwellings in the utmost terror and confusion, retiring to the neighbouring mountains with their wives and families. As the report proved groundless, some of them returned; but the greater part, dreading the cruelty of the governor, and the displeasure of the emperor, continued in their retreats. To those who returned, St Chrysostom preached some Homilies, which have reached our times, and are greatly admired; and which are said by St Chrysostom himself, as well as some cotemporary writers, to have had a considerable effect in reforming the lives of this licentious and dissolute people. On hearing the news of this tumult, Theodosius was so much enraged, that he commanded the city to be destroyed, and its inhabitants to be put to the sword without distinction; but this order was revoked before it could be put into execution, and he contented himself with a punishment similar to that inflicted by Severus above-mentioned. He appointed judges to punish the offenders; who proceeded with such severity, and condemned such numbers, that the city was thrown into the utmost consternation. On this occasion, St Chrysostom and the hermits,

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Antiochus.

mits, who were very numerous in the neighbourhood, exerted all their eloquence in behalf of the unhappy people, and obtained a reprieve for those who had been condemned. They next proceeded to draw up a memorial to the emperor in favour of the citizens in general; and being joined by Flavianus, at last obtained a general pardon, and had the city restored to all its former privileges.

In the year 458, Antioch was almost entirely ruined by an earthquake, which happened on the 14th of September; scarce a single house being left standing in the most beautiful quarter of the city. The like misfortune it experienced in 525, during the reign of the emperor Justin; and 15 years after, being taken by Cosroes king of Persia, that insulting and haughty monarch gave it up to his soldiers, who put all they met to the sword. The king himself seized on all the gold and silver vessels belonging to the great church; and caused all the valuable statues, pictures, &c. to be taken down and conveyed to Persia, while his soldiers carried off every thing else. The city being thus completely plundered, Cosroes ordered his men to set fire to it; which was accordingly done so effectually, that none of the buildings even without the walls escaped. Such of the inhabitants as escaped slaughter were carried into Persia, and sold as slaves.

Notwithstanding so many and so great calamities, the city of Antioch soon recovered its wonted splendor; but in a short time underwent its usual fate, being almost entirely destroyed by an earthquake in 587, by which 30,000 persons lost their lives. In 634, it fell into the hands of the Saracens, who kept possession of it till the year 858, when it was surprised by one Burtzas, and again annexed to the Roman empire. The Romans continued masters of it for some time, till the civil dissensions in the empire gave the Turks an opportunity of seizing upon it as well as the whole kingdom of Syria. From them it was again taken by the Crusaders in 1098. In 1262, it was taken by Bibaris sultan of Egypt, who put a final period to its glory. It is now only a small and contemptible village, known by the name of *Anthakia*; and the name of the river Orontes is changed for that of *Assi*. The walls of each quarter, as well as those which surrounded the whole, are still remaining; but as the houses are entirely destroyed, these quarters look like so many inclosed fields. Its former grandeur, however, appears in the many magnificent ruins that still remain.

ANTIOCHETTA, a town of Turkey, in Asia, in Carmania, with a bishop's see, over-against the island of Cyprus. E. Long. 32. 15. N. Lat. 36. 42.

ANTIOCHUS THE GREAT, king of Syria, succeeded his brother Seleucus Ceraunus, 223 years before Christ. He was defeated in a bloody battle, by Ptolemy Philopater, near Raphia, 217 years before Christ. Some time after, he took Sardes; attacked the Medes and Parthians; conquered Judea, Phenicia, and Cœlofrygia; and formed the design of reducing Smyrna, Lampfacus, and other cities of Asiatic Greece. These cities implored the assistance of the Romans; who sent ambassadors to oblige him to restore to Ptolemy Philadelphus the countries he had taken from him, and to suffer the free cities of Greece to enjoy the blessings of peace. Antiochus being enraged, at the solicitation of Hannibal declared war against the Romans; but

was defeated by Acilius Glabrio, and lost a great battle against Scipio Asiaticus, near Magnesia: in short, the Romans granted him a peace on very disgraceful conditions. At last, finding his exchequer low, and going to recruit it with the plunder of the temple of Belus, he was killed by the rabble, who came to save the sacred treasure, about 187 years before Christ; and was succeeded by Seleucus Philopater.

ANTIOCHUS EPIPHANES, or the *Illustrious*, usurped the throne of Syria from his nephew Demetrius, 175 years before Christ, and attempted to take Egypt from his nephew Ptolemy Philometer; but was repulsed. He deposed Onias, the high-priest of the Jews; and besieged and took Jerusalem, 170 years before Christ, when he profaned the temple of God, offered sacrifices in it to Jupiter Olympius, carried away the sacred vessels, and committed the most horrid acts of cruelty. At his return to Antioch, 167 years before Christ, he put to death the seven brothers, the Maccabees, with old Eleazar. However, Matthias and Judas Maccabeus defeated his armies; and he himself was routed by the Elymeans, and obliged to return to Babylon, where he was seized with a dreadful disease, and died in the greatest inward agonies, 164 years before the Christian æra. He was succeeded by his son,—

ANTIOCHUS EUPATOR, king of Syria, 164 years before Christ. By the advice of Lyfias his son-in-law, he entered Judea, with an army of 80,000 foot, and 80 elephants; but was defeated by Judas Maccabeus. He was killed by Demetrius his cousin-german, 162 years before the Christian æra.

There have been several other princes of the same name.

ANTIOCHUS of *Ascalon*, a celebrated philosopher, the disciple of Philo of Larissa, the master of Cicero, and the friend of Lucullus and Brutus. He was founder of a fifth academy; but, instead of attacking other sects, he set himself down to reconcile them together, particularly the sect of the stoics with that of the ancient academy.

ANTIOPE, in fabulous history, the wife of Lycus, king of Thebes, who, being disflowered by Jupiter in the form of a satyr, brought forth Amphion and Zethus.—Another Antiope was queen of the Amazons; and, with the assistance of the Scythians, invaded the Athenians; but was vanquished by Theseus.

ANTIPAROS, an island in the Archipelago, opposite to Paros, from which it is separated by a strait about seven miles over. It is the *Olearoi*, or *Oliaros*, mentioned by Strabo, Pliny, Virgil, Ovid, &c.; and was, according to Heracleides Ponticus as quoted by Stephanus, first peopled by a Phœnician colony from Sidon.—According to Mr Tournefort's account, it is about 16 miles in circumference, produces a little wine and cotton, with as much corn as is necessary for the maintenance of 60 or 70 families, who live together in a village at one end of the island, and are mostly Maltese and French corsairs.

This island is remarkable for a subterraneous cavern or grotto, accounted one of the greatest natural curiosities in the world. It was first discovered in the last century by one Magni an Italian traveller, who has given us the following account. "Having been informed (says he) by the natives of Paros, that in the little island of Antiparos, which lies about two miles from

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Antiparos.

Antiparos. the former, of a gigantic statue that was to be seen at the mouth of a cavern in that place, it was resolved that we (the French consul and himself) should pay it a visit. In pursuance of this resolution, after we had landed on the island, and walked about four miles through the midst of beautiful plains and sloping woodlands, we at length came to a little hill, on the side of which yawned a most horrid cavern, that with its gloom at first struck us with terror, and almost repressed curiosity. Recovering the first surprise, however, we entered boldly; and had not proceeded above 20 paces, when the supposed statue of the giant presented itself to our view. We quickly perceived, that what the ignorant natives had been terrified at as a giant, was nothing more than a sparry concretion, formed by the water dropping from the roof of the cave, and by degrees hardening into a figure that their fears had formed into a monster. Incited by this extraordinary appearance, we were induced to proceed still farther, in quest of new adventures in this subterranean abode. As we proceeded, new wonders offered themselves: the spars, formed into trees and shrubs, presented a kind of petrified grove; some white, some green; and all receding in due perspective. They struck us with the more amazement, as we knew them to be mere productions of Nature, who, hitherto in solitude, had, in her playful moments, dressed the scene, as if for her own amusement.

"But we had as yet seen but a few of the wonders of the place; and we were introduced as yet only into the portico of this amazing temple. In one corner of this half-illuminated recess, there appeared an opening of about three feet wide, which seemed to lead to a place totally dark, and that one of the natives assured us contained nothing more than a reservoir of water. Upon this tried, by throwing down some stones, which rumbling along the sides of the descent for some time, the sound seemed at last quashed in a bed of water. In order, however, to be more certain, we sent in a Levantine mariner, who, by the promise of a good reward, with a flambeaux in his hand, ventured into this narrow aperture. After continuing within it for about a quarter of an hour, he returned, carrying some beautiful pieces of white spar in his hand, which art could neither imitate nor equal. Upon being informed by him that the place was full of these beautiful incrustations, I ventured in once more with him, for about 50 paces, anxiously and cautiously descending by a steep and dangerous way. Finding, however, that we came to a precipice which led into a spacious amphitheatre, if I may so call it, still deeper than any other part, we returned; and being provided with a ladder, flambeaux, and other things to expedite our descent, our whole company, man by man, ventured into the same opening, and, descending one after another, we at last saw ourselves all together in the most magnificent part of the cavern.

"Our candles being now all lighted up, and the whole place completely illuminated, never could the eye be presented with a more glittering or a more magnificent scene. The roof all hung with solid icicles, transparent as glass, yet solid as marble. The eye could scarce reach the lofty and noble ceiling; the sides were regularly formed with spars; and the whole presented the idea of a magnificent theatre, illuminated with an

immense profusion of lights. The floor consisted of solid marble; and in several places, magnificent columns, thrones, altars, and other objects, appeared, as if nature had designed to mock the curiosities of art. Our voices, upon speaking or singing, were redoubled to an astonishing loudness; and, upon the firing of a gun, the noise and reverberations were almost deafening. In the midst of this grand amphitheatre rose a concretion of about 15 feet high, that, in some measure, resembled an altar; from which, taking the hint, we caused masks to be celebrated there. The beautiful columns that shot up round the altar, appeared like candlesticks; and many other natural objects represented the customary ornaments of this sacrament.

"Below even this spacious grotto, there seemed another cavern; down which I ventured with my former mariner, and descended about 50 paces by means of a rope. I at last arrived at a small spot of level ground, where the bottom appeared different from that of the amphitheatre, being composed of soft clay, yielding to the pressure, and in which I thrust a stick to about six feet deep. In this, however, as above, numbers of the most beautiful crystals were formed; one of which, particularly, resembled a table. Upon our egress from this amazing cavern, we perceived a Greek inscription upon a rock at the mouth; but so obliterated by time, that we could not read it. It seemed to import, that one Antipater, in the time of Alexander, had come thither; but whether he penetrated into the depths of the cavern, he does not think fit to inform us."

From this account Mr Tournefort's differs considerably. Mr Magni mentions only one descent or precipice from the entry of the cave to the grotto, or most magnificent part: Mr Tournefort says that there were many very dangerous precipices and rugged ways, through which they were obliged to pass sometimes on their back, and sometimes on their belly; but gives no particular account of his journey till he comes to the grand cavern. This indeed he describes very pompously; but as by it he evidently wants to support a favourite hypothesis, namely, the vegetation of stones, perhaps the particulars are not altogether to be depended upon. He informs us, that, at the entry into the cavern, he met with a Greek inscription almost defaced, containing a good number of proper names; and that there was a tradition among the inhabitants, that these were the names of some who had conspired against Alexander the Great, and having missed their aim, had taken refuge in this grotto.

The most particular account, however, of this famous grotto that hath hitherto been published, appeared in the British magazine, in a letter signed *Charles Saunders*, and dated Feb. 24th 1746-7; which, as it is very particular, and seems to bear sufficient marks of authenticity, we shall here insert. "Its entrance lies in the side of a rock, about two miles from the sea-shore; and is a spacious and very large arch, formed of rough craggy rocks, overhung with brambles and a great many climbing plants, that give it a gloominess which is very awful and agreeable. Our surgeon, myself, and four passengers, attended by six guides with lighted torches, entered this cavern about eight o'clock in the morning, in the middle of August last. We had not gone 20 yards in this cavity, when we lost all sight of day-light: but our guides going before us with

Antiparor. with lights, we entered into a low narrow kind of alley, surrounded every way with stone all glittering like diamonds by the light of our torches; the whole being covered and lined throughout with small crystals, which gave a thousand various colours by their different reflections. This alley grows lower and narrower as one goes on, till at length one can scarce get along it. At the end of this passage, we were each of us pre-ent with a rope to tie about our middles; which when we had done, our guides led us to the brink of a most horrible precipice. The descent into this was quite steep, and the place all dark and gloomy. We could see nothing, in short, but some of our guides with torches in a miserable dark place, at a vast distance below us. The dreadful depth of this place, and the horror of the descent thro' a miserable darkness into it, made me look back to the lane of diamonds, if I may so call it, thro' which we had just passed; and I could not but think I was leaving heaven, to descend into the infernal regions. The hope of something fine at my journey's end, tempted me, however, to trust myself to the rope and my guides at the top, to let myself down. After about two minutes dangling in this posture, not without much pain as well as terror, I found myself safe, however, at the bottom; and our friends all soon followed the example. When we had congratulated here with one another on our safe descent; I was inquiring where the grotto, as they called it, was. Our guides, shaking their heads, told us, we had a great way to that yet; and led us forward about 30 yards under a roof of ragged rocks, in a scene of terrible darkness, and at a vast depth from the surface of the earth, to the brink of another precipice much deeper and more terrible than the former. Two of the guides went down here with their torches first; and by their light we could see, that this passage was not so perpendicular indeed as the other, but lay in a very steep slant, with a very slippery rock for the bottom; vast pieces of rough rugged rocks jutting out in many places on the right hand, in the descent, and forcing the guides sometimes to climb over, sometimes to creep under them, and sometimes to round them; and on the left, a thousand dark caverns, like so many monstrous wells, ready, if a foot should slip, to swallow them up for ever. We stood on the edge to see these people with their lights descend before us; and were amazed and terrified to see them continue descending till they seemed at a monstrous and most frightful depth. When they were at the bottom, however, they hallowed to us; and we, trembling and quaking, began to descend after them. We had not gone 30 feet down, when we came to a place where the rock was perfectly perpendicular; and a vast cavern seemed to open its mouth to swallow us up on one side, while a wall of rugged rock threatened to tear us to pieces on the other. I was quite disheartened at this terrible prospect, and declared I would go back: but our guides assured us there was no danger; and the rest of the company resolving to see the bottom now they were come so far, I would not leave them: so on we went to a corner where there was placed an old slippery and rotten ladder, which hung down close to the rock; and down this, one after another, we at length all descended. When we had got to the bottom of this we found ourselves at the entrance of another passage, which was terrible e-

nough indeed; but in this there was not wanting something of beauty. This was a wide and gradual descent; at the entrance of which one of our guides seated himself on his breech, and began to slide down, telling us we must do the same. We could discover, by the light of his torch, that this passage was one of the noblest vaults in the world. It is about nine feet high, seven wide, and has for its bottom a fine green glossy marble. The walls and arch of the roof of this being as smooth and even in most places as if wrought by art, and made of a fine glittering red and white granite, supported here and there with columns of a deep blood-red shining porphyry, made, with the reflection of the lights, an appearance not to be conceived. This passage is at least 40 yards long; and of so steep a descent, that one has enough to do, when seated on one's breech, not to descend too quickly. Our guides that we kept with us, could here keep on each side of us: and, what with the prodigious grandeur and beauty of the place, our easy travelling thro' it, and the diversion of our now and then running over one another whether we would or not; this was much the pleasantest part of our journey. When we had entered this passage, I imagined we should at the bottom join the two guides we had first sent down: but alas! when we were got there, we found ourselves only at the mouth of another precipice, down which we descended by a second ladder not much better than the former. I could have admired this place also, would my terror have suffered me; but the dread of falling, kept all my thoughts employed during my descent. I could not but observe, however, as my companions were coming down after me, that the wall, if I may so call it, which the ladder hung by, was one mass of blood-red marble, covered with white spires of rock crystal as long as my finger, and making, with the glow of the purple from behind, one continued immense sheet of amethysts. From the foot of this ladder we slid on our bellies through another shallow vault of polished green and white marble, about 20 feet; and at the bottom of this joined our guides. Here we all got together once again; and drank some rum, to give us courage before we proceeded any farther. After this short refreshment, we proceeded by a strait, but somewhat slanting passage, of a rough, hard, and somewhat coarse stone, full of a thousand strange figures of snakes rolled round, and looking as if alive; but in reality as cold and hard as the rest of the stone, and nothing but some of the stone itself in that shape. We walked pretty easily along this descent for near 200 yards; where we saw two pillars seemingly made to support the roof from falling in: but in reality it was no such thing; for they were very brittle, and made of a fine glittering yellow marble. When we had passed these about 20 yards, we found ourselves at the brink of another very terrible precipice: but this our guides assured us was the last; and there being a very good ladder to get down by, we readily ventured. At the bottom of this steep wall, as I may call it, we found ourselves for some way upon plain even ground; but, after about 40 yards walking, were presented by our guides with ropes again; which we fastened about our middles, though not to be swung down by, but only for fear of danger, as there are lakes and deep waters all the way from hence on the left hand. With this caution, however, we entered the last alley; and

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and horrible work it was indeed to get through it. All was perfectly horrid and dismal here. The sides and roof of the passage were all of black stone; and the rocks in our way were in some places so steep, that we were forced to lie all along on our backs, and slide down; and so rough, that they cut our clothes, and bruised us miserably in passing. Over our heads, there were nothing but ragged black rocks, some of them looking as if they were every moment ready to fall in upon us; and, on our left hands, the light of our guides torches shewed us continually the surface of dirty and miserably looking lakes of water. If I had heartily repented of my expedition often before, here I assure you I was all in a cold sweat, and fairly gave myself over for lost; heartily cursing all the travellers that had written of this place, that they had described it so as to tempt people to see it, and never told us of the horrors that lay in the way. In the midst of all these reflections, and in the very dimmest part of all the cavern, on a sudden we had lost four of our six guides. What was my terror on this sight! The place was a thousand times darker and more terrible for want of their torches; and I expected no other, but every moment to follow them into some of these lakes, into which I doubted not but they were fallen. The remaining two guides said all they could, indeed, to cheer us up; and told us we should see the other four again soon, and that we were near the end of our journey. I don't know what effect this might have upon the rest of my companions; but I assure you I believed no part of the speech but the last, which I expected every moment to find fulfilled in some pond or precipice. Our passage was by this time become very narrow, and we were obliged to crawl on all-fours over rugged rocks; when in an instant, and in the midst of these melancholy apprehensions, I heard a little hissing noise, and saw myself in utter, and not to be described, darkness. Our guides called indeed cheerfully to us, and told us that they had accidentally dropped their torches into a puddle of water, but we should soon come to the rest of them, and they would light them again; and told us there was no danger, and we had nothing to do but to crawl forward. I cannot say but I was amazed at the courage of these people; who were in a place where, I thought, four of them had already perished, and from whence we could none of us ever escape; and determined to lie down and die where I was. Words cannot describe the horror, or the extreme darkness, of the place. One of our guides, however, perceiving that I did not advance, came up to me, and clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this strange condition, expecting every moment death in a thousand shapes, and trembling to think what the guide meant by this rough proceeding, he lifted me at once over a great stone, set me down on my feet, and took his hand from before my eyes. What words can describe at that instant my astonishment and transport! Instead of darkness and despair, all was splendor and magnificence before me; our guides all appeared about us; the place was illuminated by 50 torches, and the guides all welcomed me into the grotto of Antiparos. The four that were first missing, I now found, had only given us the slip, to get the torches lighted up before we came; and the other two had put out their lights on purpose, to make us enter out of ut-

Antiparos.

ter darkness into this pavilion of splendor and glory. I am now come to the proper business of this letter; which was, to describe this grotto. But I must confess to you that words cannot do it. The amazing beauties of the place, the eye that sees them only can conceive. The best account I can give you, however, pray accept of.

The people told us, the depth of this place was 485 yards. The grotto, in which we now were, is a cavern of 120 yards wide, and 113 long, and seems about 60 yards high in most places. These measures differ something from the accounts travellers in general give us; but you may depend upon them as exact, for I took them with my own hand. Imagine then with yourself, an immense arch like this, almost all over lined with fine and bright chrysalized white marble, and illuminated with 56 torches; and you will then have some faint idea of the place I had the pleasure to spend three hours in. This, however, is but a faint description of its beauties. The roof, which is a fine vaulted arch, is hung all over with icicles of white shining marble, some of them ten foot long, and as thick as one's middle at the root: and among these there hang 1000 festoons of leaves and flowers of the same substance; but so very glittering, that there is no bearing to look up at them. The sides of the arch are planted with seeming trees of the same white marble, rising in rows one above another, and often inclosing the points of the icicles. From these trees there also hung festoons, tied as it were from one to another in vast quantities; and in some places among them there seem rivers of marble winding through them in a thousand meanders. All these things are only made, in a long course of years, from the dropping of water, but really look like trees and brooks turned to marble. The floor we trod upon was rough and uneven, with crystals of all colours growing irregularly out of it, red, blue, green, and some of a pale yellow. These were all shaped like pieces of salt-petre; but so hard, that they cut our shoes: among these, here and there, are placed icicles of the same shining white marble with those above, and seeming to have fallen down from the roof and fixed there; only the big end of these is to the floor. To all these our guides had tied torches, two or three to a pillar, and kept continually beating them to make them burn bright. You may guess what a glare of splendor and beauty must be the effect of this illumination, among such rocks and columns of marble. All round the lower part of the sides of the arch are a thousand white masses of marble, in the shape of oak-trees. Mr Tournefort compares them to cauliflower, but I should as soon compared them to toad-stools. In short, they are large enough to inclose, in many places, a piece of ground big enough for a bed-chamber. One of these chambers has a fair white curtain, whiter than satin, of the same marble, stretched all over the front of it. In this we all cut our names, and the date of the year, as a great many people have done before us. In a course of years afterwards, the stone blisters out like this white marble over the letters. Mr Tournefort thinks the rock grows like oaks or apple-trees for this reason; but I remember I saw some of the finest cockle and muscle shells, in the rock thereabouts, that ever I saw in my life. I wonder whether he thinks they grow there too. Besides, if this rock grows so fast, the cavern ought to be all grown up by this time; and

Antipater,
Antipathy.

and yet, according to his measures and mine, it seems on the other hand to be grown bigger since. Indeed, all that I can gather from his account of this glorious place is, that he had drank a bottle or two too much before he went down into it."

ANTIPATER, the disciple of Aristotle, and one of Alexander the Great's generals, was a man of great abilities, and a lover of the sciences; but was accused of poisoning Alexander. He subdued the revolted Thracians, relieved Megalopolis, and overthrew the Spartans there. He died 321 years before the Christian æra.

ANTIPATER, an Idumean of illustrious birth, and possessed of great riches and abilities, taking advantage of the confusion into which the two brothers Hyrcanus and Aristobulus plunged Judea by their contest for the office of high-priest, took such measures as to gain Hyrcanus that office, and under his government to obtain the absolute direction of all affairs; while his great abilities and application to business made him so considerable, that he was honoured as much as if he had been invested with the royal authority in form: but he was at last poisoned by a Jew, named Malachus, 43 years before the Christian æra. He left among his other children, the famous Herod king of the Jews.

ANTIPATER (Cælius), a Roman historian, who wrote a history of the Punic war, much valued by Cicero. The emperor Adrian preferred him to Sallust.

ANTIPATER of Sydon, a Stoic philosopher, and likewise a poet, commended by Cicero and Seneca: he flourished about the 171st Olympiad. We have several of his epigrams in the *Anthologia*.

ANTIPATHY, in physiology, is formed from the two Greek words, *anti* *contrary*, and *pathos* *passion*. Literally taken, the word signifies *incompatibility*: but for the most part the term *antipathy* is not used to signify such incompatibilities as are merely physical; it is reserved to express the aversion which an animated or sensitive being feels at the real or ideal presence of particular objects. In this point of view, which is the light in which we at present consider the term, *antipathy*, in common language, signifies, "a natural horror and detestation, an insuperable hatred, an involuntary aversion, which a sensitive being feels for some other object, whatever it is, though the person who feels this abhorrence is entirely ignorant of its cause, and can by no means account for it." Such is, they say, the natural and reciprocal hostility between the salamander and the tortoise; between the toad and the weasel; or between sheep and wolves. Such is the invincible aversion of particular persons against cats, mice, spiders, &c.; a prepossession which is sometimes so violent, as to make them faint at the sight of these animals. Of these and a thousand other antipathies the ancient naturalists, the schoolmen, and the vulgar, form so many legends; and relate them as certain facts, that they may demand an explication of them from the philosophers. But these sages begin with investigating whether such antipathies actually exist or not.

To explore the matter without prejudice, we shall find it necessary to abstract from the subjects of this disquisition, 1. All such antipathies as are not ascertained; as that which is supposed to be felt by hens at the sound of an harp whose strings are made of a fox's bowels, between the salamander and tortoise, and

between the weasel and the toad. Nothing is less confirmed, or rather nothing is more false, than these facts, with which vulgar credulity and astonishment are amused and actuated: and though some of these antipathies should be ascertained, this would be no proof that the animals which feel them are not acquainted with their causes, according to their mode and proportion of knowledge; in which case, it will be no longer the antipathy which we have defined.

2. We must abstract those antipathies which can be extinguished or refused at pleasure; those fictitious aversions, which certain persons feel, or pretend to feel, with affected airs, that they may appear more precise and finical, or singularly and prodigiously elegant; that they may seem to have qualities so exquisitely fine, as require to be treated with peculiar delicacy. One who bestows any attention on the subject, would be astonished to find how many of these chimerical aversions there are, which are pretended, and passed upon the world by those who affect them as natural and unconquerable.

3. When we abstract those aversions the causes of which are known and evident; we shall be surprised, after our deduction of these pretended antipathies from the general fund, how small, how inconsiderable, is the quantity of those which are conformable to our definition. Will any one pretend to call by the name of *antipathy*, those real, innate, and incontestable aversions which prevail between sheep and wolves? Their cause is obvious: the wolf devours the sheep, and subsists upon his victims; and every animal naturally flies with terror from pain or destruction: sheep ought therefore to regard wolves with horror, which for their nutrition tear and mangle the unresisting prey. From principles similar to this, arises that aversion which numbers of people feel against serpents; against small animals, such as reptiles in general, and the greatest number of insects. During the credulous and susceptible period of infancy, pains have been taken to impress on our minds the frightful idea that they are venomous; that their bite is mortal; that their sting is dangerous, productive of tormenting inflammations or tumours, and sometimes fatal: they have been represented to us as ugly and fard; as being, for that reason, pernicious to those who touch them; as poisoning those who have the misfortune to swallow them. These horrible prepossessions are industriously inculcated from our infancy; they are sometimes attended and supported by dismal tales, which are greedily imbibed, and indelibly engraven on our memories. It has been taught us both by precept and example, when others at their approach have assumed in our view the appearance of detestation and even of terror, that we should fly from them, that we should not touch them. Is it then wonderful (if our false impressions as to this subject have been corrected neither by future reflections nor experiments), that we should entertain, during our whole lives, an aversion from these objects, even when we have forgot the admonitions, the conversations, and examples, which have taught us to believe and apprehend them as noxious beings? and in proportion to the sensibility of our frame, in proportion as our nerves are irritable, our emotions at the sight of what we fear will be more violent, especially if they anticipate our expectation, and seize us unprepared, though our ideas of what

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Antipathy. what we have to fear from them are the most confused and indistinct imaginable. To explain these facts, is it necessary to fly to the exploded subterfuge of occult qualities inherent in bodies, to latent relations productive of antipathies, of which no person could ever form an idea?

It is often sufficient to influence a person who had formerly no aversion for an object, if he lives with some other associate who gives himself up to such capricious panics; the habit is insensibly contracted to be agitated with disagreeable emotions at the presence of an object which had been formerly beheld with indifference and cold blood. I was acquainted, (says the author of the article *Antipathy* in the French *Encyclopédie*) with a person of a very found understanding, whom thunder and lightning by no means terrified; nay, to whom the spectacle appeared magnificent and the sound majestic; yet to a mind thus seemingly fortified against the infectious terror, no more was necessary than spending the summer with a friend in whom the appearance of lightning excited the strongest emotions, and whom the remotest clap of thunder affected with extravagant paroxysms, to become timid in excess at the approach of thunder, nor could he ever afterwards surmount the fear which it inspired.—The frightful stories of dogs and cats, which have killed their masters, or which have given them mortal wounds, are more than sufficient to inspire a timorous person with aversion against these animals; and if the olfactory nerves of such a person be delicate, he will immediately discover the smell of them in a chamber: disturbed by the apprehension which these effluvia excite in his mind, he gives himself up to the most violent uneasiness, which is tranquillized when he is assured that the animal is no longer in the room. If by chance, in the search which is made to calm the uneasiness of this timorous person, one of these creatures should at last be discovered, every one presently exclaims, *A miracle!* and admits the reality of *antipathies* into his creed; whilst all this is nothing but the effect of a childish fear, founded on certain confused and exaggerated ideas of the hazard which one may run with these animals. The *antipathy* which some people entertain against eels, tho' they are eaten by others with pleasure, arises from nothing but the fear of serpents, to which these fishes are in some degree similar. There are likewise other *antipathies* which do not originate in the imagination, but arise from some natural incongruity; such as we often remark in children, for particular kinds of victuals, with which their taste is not offended, but which their stomachs cannot digest, and which are therefore disgorged as soon as swallowed.

To what then are those *antipathies*, of which we have heard so much, reducible? Either to legendary tales; or to aversions against objects which we believe dangerous; or to a childish terror of imaginary perils; or to a disrelish, of which the cause is disguised; or to a ridiculous affectation of delicacy; or to an infirmity of the stomach; in a word, to a real or pretended reluctance for things which are either invested, or supposed to be invested, with qualities hurtful to us. Too much care cannot be taken in preventing, or regulating, the *antipathies* of children; in familiarizing them with objects of every kind; in discovering to them, without emotion, such as are dangerous; in teaching them the

means of defence and security, or the methods of escaping their noxious influence; and, when the rational powers are matured by age, in reflecting on the nature of those objects which we fear, in ascertaining what has been told concerning their qualities, or in vigorously operating upon our own dispositions to overcome those vain repugnances which we may feel. See *Symmetry*, which is the opposite of *Antipathy*.

ANTIPATHY, in ethics, hatred, aversion, repugnancy. *Hatred* is entertained against persons; *aversion*, and *antipathy*, indiscriminately against persons or things; and *repugnancy*, against actions alone.

Hatred is more voluntary than *aversion*, *antipathy*, or *repugnancy*. These last have greater affinity with the animal constitution. The causes of *ANTIPATHY* are less known than those of *aversion*. *Repugnancy* is less permanent than either the one or the other.—We hate a vicious character, we feel *aversion* to its exertions: we are affected with *ANTIPATHY* for certain persons at first sight; there are some affairs which we transact with *repugnancy*.—*Hatred* calumniates; *aversion* keeps us at a distance from certain persons; *ANTIPATHY* makes us detest them; *repugnancy* hinders us from imitating them.

ANTIPHONY, in music, the name which the Greeks gave to that kind of symphony which was executed in octave or double octave. It is likewise the answer made by one choir to another, when an anthem is sung between them.

ANTIPODES, in geography, a name given to those inhabitants of the globe that live diametrically opposite to each other. The word is Greek, and compounded of *anti* opposite, and *pus* a foot; because their feet are opposite to each other.

The antipodes lie under opposite meridians and opposite parallels; in the same degree of latitude, but of opposite denominations, one being north and the other south. They have nearly the same degree of heat and cold, days and nights of equal length, but in opposite seasons. It is noon to one, when midnight to the other; and the longest day with the one, is the shortest with the other.

Plato is esteemed the first who thought it possible that the antipodes subsisted, and is looked upon as the inventor of the word. As this philosopher apprehended the earth to be spherical, he had only one step to make to conclude the existence of the antipodes.

The ancients, in general, treated this opinion with the highest contempt; never being able to conceive how men and trees could subsist suspended in the air with their feet upwards, for so they apprehended they must be in the other hemisphere.

They never reflected that these terms *upwards* and *downwards* are merely relative; and signify only nearer to, or farther from, the centre of the earth, the common centre to which all heavy bodies gravitate; and that, therefore, our antipodes have not their feet upwards and head downwards any more than ourselves; because they, like us, have their feet nearer the centre of the earth, and their heads further from it. To have the head downwards and feet upwards, is to place the body in a direction of gravity tending from the feet to the head: but this cannot be supposed with regard to the antipodes; for they, like us, tend toward the centre of the earth, in a direction from head to foot.

AN-

Antipathy
Antipodes.

Antiquary
Antiquities.

ANTIQUARY, a person who studies and searches after monuments and remains of antiquity.

There were formerly, in the chief cities of Greece and Italy, persons of distinction called *antiquaries*, who made it their business to explain the ancient inscriptions, and give every other assistance in their power to strangers who were lovers of that kind of learning. There is a society of antiquaries in London, incorporated by the king's charter. See SOCIETY.

ANTIQUATED, something obsolete, out of date, or out of use.

ANTIQUE, in a general sense, something that is ancient: but the term is chiefly used by sculptors, painters, and architects, to denote such pieces of their different arts as were made by the ancient Greeks and Romans. Thus we say, an antique bust, an antique statue, &c.

ANTIQUE is sometimes contradistinguished from *ancient*, which signifies a less degree of antiquity. Thus, antique architecture is frequently distinguished from ancient architecture.

ANTIQUITIES, a term implying all testimonies, or authentic accounts, that have come down to us, of ancient nations. Bacon calls *antiquities* the wrecks of history, or such particulars as industrious and learned persons have collected from genealogies, inscriptions, monuments, coins, names, etymologies, archives, instruments, fragments of history, &c.

Antiquities form a very extensive science, including "an historical knowledge of the edifices, magistracies, offices, habiliments, manners, customs, ceremonies, worship, and other objects worthy of curiosity, of all the principal ancient nations of the earth."

This science is not a matter of mere curiosity, but is indispensable to the theologian; who ought to be thoroughly acquainted with the antiquities of the Jews, to enable him properly to explain numberless passages in the Old and New Testaments: to the lawyer; who, without the knowledge of the antiquities of Greece and Rome, can never well understand, and properly apply, the greatest part of the Roman laws: to the physician and the philosopher, that they may have a complete knowledge of the history and principles of the physic and philosophy of the ancients: to the critic, that he may be able to understand and interpret ancient authors: to the orator and poet; who will be thereby enabled to ornament their writings with numberless images, allusions, comparisons, &c.

Antiquities are divided into sacred and profane, into public and private, universal and particular, &c. It is true, that the antiquaries (especially such as are infected with a spirit of pedantry, and the number of these is great) frequently carry their inquiries too far, and employ themselves in laborious researches after learned trifles: but the abuse of a science ought never to make us neglect the applying it to rational and useful purposes.

Many antiquaries also restrain their learned labours to the eclairsissement of the antiquities of Greece and Rome: but this field is far too confined, and by no means contains the whole of this science, seeing it properly includes the antiquities of the Jews, Egyptians, Persians, Phenicians, Carthaginians, Hetruscans, Germans, and, in general, all those principal nations mentioned in ancient history*; so far as any accounts

of them are come down to us.

If to the general subjects above-mentioned we add the particular study of antiques, of the statues, bas-reliefs, and the precious relics of architecture, painting, cameius, medals, &c. it is easy to conceive that antiquities form a science very extensive and very complicated, and with which only a very small acquaintance could have been attainable by any one man, if our predecessors had not prepared the way for us; if they had not left us such inestimable works as those of Gronovius, Grævius, Montfaucon, count Caylus, Winckelman, the Hebraic antiquities of D. Iken of Bremen, the Grecian antiquities of Brunings, the Roman antiquities of Nieupoort, and especially that work which is intitled *Bibliographia Antiquaria Joh. Alberti Fabricii*, professor at Hamburg; &c. &c. Nor must we here forget that very valuable work, with which our countryman Mr Robert Wood has lately enriched this science, and which is so well known, and so justly esteemed by all true connoisseurs, under the title of the *Ruins of Palmyra*, and those of *Belbeck*. It is by this work that we are fully convinced of the grandeur and magnificence, the taste and elegance, of the buildings of the ancients. We here see that the invention of these matters is not all owing to the Greeks, but that there were other nations who served them as models. For, tho' many of the edifices of Palmyra are to be attributed to the emperor Aurelian, and to Odenatus and his wife Zenobia, who reigned there about the year 264, yet there are found, at the same place, ruins of buildings, that appear to be of far greater antiquity, and that are not less beautiful. The ancient Persepolis is sufficient to prove this assertion. When we duly reflect on all these matters, and especially if we attempt to acquire any knowledge of this science, we shall soon be convinced that it but ill becomes a petit-maitre to laugh at a learned antiquary.

The knowledge of those monuments of the ancients, the works of sculpture, statuary, graving, painting, &c. which they call *antiquer*, requires a strict attention, with regard to the matter itself on which the art has been exercised; as the wax, clay, wood, ivory, stones of every kind, marble, flint, bronze, and every sort of metal. We should begin by learning on what matter each ancient nation principally worked, and in which of the fine arts they excelled. For the matter itself, as the different sorts of marble, compositions of metals, and the species of precious stones, serve frequently to characterize the true antique, and to discover the counterfeit. The connoisseurs pretend also to know, by certain distinct characters in the design and execution of a work of art, the age and nation where it was made. They find, moreover, in the invention and execution, a degree of excellence, which modern artists are not able to imitate. Now, though we ought to allow, in general, the great merit of the ancients in the polite arts, we should not, however, suffer our admiration to lead us into a blind superstition. There are pieces of antiquity of every sort, which have come down to us; some that are perfectly excellent; and others so wretched, that the meanest among modern artists would not acknowledge them. The mixture of the good and bad has taken place in all subjects, at all times, and in all nations. The misfortune is, that most of our great antiquaries have

Antiquities.

* See History, Part II.

Antiquities

Antirrhinum.

been so little skilled in designing, as scarcely to know how to draw a circle with a pair of compasses. It is prejudice, therefore, which frequently directs them to give the palm to the ancients, rather than a judgement directed by a knowledge of the art. That character of expression, which they find so marvellous in the works of antiquity, is often nothing more than a mere chimera. They pretend that the artists of our days constantly exaggerate their expressions; that a modern Bacchus has the appearance of a man distracted with intoxication; that a Mercury seems to be animated with the spirit of a fury; and so of the rest. But let them not decide too hastily. Almost all the antique figures are totally void of all spirit of expression; we are forced to guess at their characters. Every artificial expression requires, moreover, to be somewhat exaggerated. A statue or portrait is an inanimate figure; and must therefore have a very different effect from one which, being endowed with life, has the muscles constantly in play, and where the continual change of the features, the motion of the eyes, and the looks, more or less lively, easily and clearly express the passions and sentiments. Whereas, in a figure that is the produce of art, the delicate touches, that should express the passions, are lost to the eyes of the spectators: they must therefore be struck by strong, bold characters, which can affect them at the first glance of the eye. A very moderate artist is sensible, at the same time, that he is not to give his figures extravagant expressions, nor to place them in distorted attitudes.

Besides the knowledge above explained, there remain, 1. That of medals and coins *: 2. The diplomatic, and the explication of inscriptions †: And, 3. The knowledge of books ‡.

ANTIQUITY signifies times or ages past long ago. Thus, we say, the heroes of antiquity, &c.

ANTIQUITY is also used to denote the works or monuments of antiquity. See ANTIQUITIES.

ANTIQUITY likewise expresses the great age of a thing; and in this sense we say the antiquity of a family, the antiquity of a kingdom.

ANTIRRHINUM, SNAP-DRAGON, or CALVES-SNOUT; a genus of the angiospermia order, belonging to the didynamia class of plants. To this genus Linæus has joined the linaria and asarina; but as these are generally kept separate by other botanical writers, and several species of each of them described, we chuse to follow their example.

Species. 1. The majus, with spear-shaped leaves, having footstalks. This is not a native of Britain; but having been brought into gardens, the seeds scattered about in so great plenty, that it is become common upon walls and old buildings in many parts of the country. Of this sort there are several varieties, which differ in the colour of their flowers; some having red flowers with white mouths, some with yellow mouths, and others have white flowers with yellow mouths. There is also one with striped leaves. 2. The latifolium, with smooth spear-shaped leaves, is a native of the Archipelagoislands. The leaves are much broader, the flowers greatly larger and more beautiful, than those of any other species, and therefore this best deserves a place in gardens. The other species are the minus, with obtuse spear-shaped leaves; the italicum, with narrow, hairy leaves; and the siculum, with foot-stalks pro-

ceeding from the wings of the leaves.

Culture. These plants grow best on old walls, or on a sandy rocky soil. In rich ground they grow very luxuriant for a while, but are apt to rot in winter. They are propagated by seeds, which should be sown in the beginning of March where they are to remain. When the plants come up, they require no other care than to be kept free from weeds. The variety of the first species with striped leaves, may also be propagated by cuttings. They begin to flower in July, and continue flowering till prevented by frost. When planted on walls, they will have strong woody stems, which are rarely hurt by frost.

ANTIRRHUM, a promontory at the mouth of the Corinthian bay, where it is scarce a mile broad, and where it separates the Ætolians from the Peloponnesus; so called from its opposite situation to Rhium in Peloponnesus, (Pliny): both are now called the *Dardanelles of Lepanto*.

ANTISABBATARIANS, a modern religious sect, who oppose the observance of the Christian sabbath. The great principle of the Antisabbatarians is, that the Jewish sabbath was only of ceremonial, not moral obligation; and consequently is abolished by the coming of Christ.

ANTISAGOGUE, in rhetoric, a figure differing little from that called *concession*. The following passage from Cicero is an instance of it: *Difficilis ratio belli gerendi; at plena fidei, plena pietatis: et si gloria ex his immortalis est consecratur*. See CONCESSION.

ANTISCII, in geography, people who live on different sides of the equator, whose shadows at noon are projected opposite ways. Thus the people of the north are Antiscii to those of the south; the one projecting their shadows at noon toward the north pole, and the other toward the south pole.

ANTISCORBUTICS, medicines good in scorbutical cases.

ANTISEPTICS, among physicians, a denomination given to all substances that resist putrefaction *: * See *Putrefaction*, such as salts of all kinds, vinegar, myrrh, snake-root, *fascion*, pepper, &c.

ANTISTASIS, in oratory, a defence of an action from the consideration that had it been omitted worse would have ensued. This is called by Latin writers *comparativum argumentum*; such, e. gr. would be the general's defence, who had made an inglorious capitulation, that, without it, the whole army must have perished.

ANTISTHENES, a Greek philosopher, and founder of the Cynics. He was born at Athens, and passed the former part of his life as a soldier. Having afterwards been an attendant at the lectures of Socrates, he was principally charmed with those exhortations of that great philosopher, which persuaded to frugality, to temperance, and to moderation: these Antisthenes was resolved to practise by carrying every precept to its utmost extent. Permitting therefore his beard to grow, he went about the streets in a thread-bare coat, scarcely to be distinguished from a common beggar. He prided himself upon the most rigid virtue, and thought himself obliged to attack the vicious where-ever he found them. This gave him some reputation in the city; but it may be supposed, that, in a place so very luxurious as Athens, he

Antirrhinum

Antisthenes

* See the article *Medals*.
† See *Diplomatics*.
‡ See *History*, Part VII.

* See *Putrefaction*.

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he had more enemies than disciples. His philosophy consisted rather in action than speculation: it was therefore his constant maxim, That to be virtuous was to be happy, and that all virtue consisted in action; that the wise man should live for himself, contented in all situations, and happy alone in the consciousness of his own virtue. He acknowledged nothing to be good but what was honourable; and asserted, that virtue might be acquired by practice. Laertius tells us there were 10 tomes of his works; and he has given us many of his apophthegms.

ANTISTOECHON, in grammar, the using one letter instead of another; as *olli* for *illi*.

ANTISTROPHE, in grammar, a figure by which two things mutually depending on one another, are reciprocally converted; as, *the servant of the master, the master of the servant*.

ANTISTROPHE, among lyric poets, that part of a song and dance in use among the ancients, which was performed before the altar, in returning from west to east; in opposition to strophe. See STROPHE, and ODE.

ANTITACTÆ, in church-history, a branch of Gnostics, who held, that God was good and just, but that a creature had created evil; and consequently that it is our duty to oppose this author of evil, in order to avenge God of his adversary.

ANTITHENAR, in anatomy, a name given to the adductor indicis. See ANATOMY, *Table of the Muscles*.

ANTITHESIS, contrast, or opposition of words or sentiments; as,

—Though gentle, yet not dull;
Strong, without rage; without overflowing, full.

ANTITHESIS is sometimes used for controversy. In this sense, we meet with *antithetic* method, *antithetic* discourses, &c. Marcion composed a volume of *Antitheses*, or contrarieties and oppositions between the law and the gospel.

ANTITRAGUS MUSCULUS, in anatomy, a muscle of the ear. See ANATOMY, n° 405, a; and *Table of the Muscles*.

ANTITRINITARIANS, a general name given to all those who deny the doctrine of the Trinity, and particularly to the Arians and Socinians.

ATITYPE, among ecclesiastical writers, denotes a type corresponding to some other type or figure.

ANTIUM, (Livy;) *Antia*, Dionysius Halicarnassensis; a city of the Volsci, (Livy;) situated on the Tuscan sea, yet without a harbour, because they had a neighbouring hamlet, called *Ceno*, with a harbour, (Strabo). The Romans gained their first reputation in naval affairs against the Antiates; part of whose ships they conveyed into the arsenal of Rome, and part they burnt, and with their beaks, or rostra, adorned the pulpit erected in the Forum, thence called *Rostra*, (Livy, Florus). Several colonies were successively sent thither, (Livy, Tacitus). The epithet is *Antianus*, *Antieris*, *Antiatinus*, and *Antiar*, *atis*; the people *Antiates*. Here stood a famous temple of Fortune, (Horace). Addison says, there were two Fortunes worshipped at Antium.—The birth-place of Caligula and Nero, (Sueton); but, according to Pliny, the Ambiatinus Vicus was the birth-place of Caligula. It is now extinct, but the name still remains in the *Capo d' Anzo*.

ANTIVARI, a strong town of Turkey, in Europe, in Dalmatia, a Greek archbishop's see, and subject to the Turks. E. Lon. 29. 15. N. Lat. 43. 0.

ANTLER, among sportsmen, a start or branch of a deer's attire.

Brow-ANTLER, denotes the branch next the head; and,

Bes-ANTLER, the branch next above the brow-antler.

ANTLIA, an ancient machine, supposed to be the same with our pump. Hence the phrase, *in antliam condemnari*, according to the critics, denotes a kind of punishment, whereby criminals were condemned to drain ponds, ditches, or the like.

ANTOECI, in geography, those inhabitants of the earth who live under the same meridian, and at the same distance from the equator; the one toward the north, and the other toward the south. Hence they have the same longitude; and their latitude is also the same, but of a different denomination. They are in the same semicircle of the meridian, but opposite in parallels. They have precisely the same hours of the day and night, but opposite seasons; and the night of the one is always equal to the day of the other.

ANTOINE, a town of France, in Dauphiny, in the diocese of Vienne, with a celebrated abbey. It is seated among the mountains, 13 miles east of Lyons. E. Lon. 5. 20. N. Lat. 45. 43.

ANTONIA, a citadel of Jerusalem, the origin of which we have in Josephus; who says, that Hyrcanus, the first high-priest of that name, built Baris near the temple, a house with turrets, where he generally resided. Herod afterwards made it stronger, for the security and defence of the temple; and in honour of Marc Antony, who then commanded in the east, called it *Antonia*. It was very extensive, and could accommodate a Roman legion: from it there was a full view of the temple.

ANTONIA (St), a town of France, in Rouergue, in the diocese of Rhodéz, whose fortifications are demolished. It is seated on the river Aveyron. E. Long. 0. 55. N. Lat. 44. 10.

ANTONIAN WATERS, medicinal waters of Germany, very pleasant to the taste, and esteemed good in many chronic and hypochondriac cases.

ANTONIANO (Silvio), a man of great learnings, who raised himself from a low condition by his merit, was born at Rome in the year 1540. When he was but ten years old, he could make verses upon any subject proposed to him; and these so excellent, though pronounced extempore, that even a man of genius could not compose the like without a good deal of time and pains. The duke de Ferrara coming to Rome, to congratulate Marcellus II. upon his being raised to the pontificate, was so charmed with the genius of Antoniano, that he carried him to Ferrara, where he provided able masters to instruct him in all the sciences. From thence he was sent for by Pius IV. who made him professor of the belles lettres in the college at Rome. Antoniano filled this place with so much reputation, that, on the day when he began to explain the oration *pro Marco Marcello*, he had a vast crowd of auditors, and among these no less than 25 cardinals. He was afterwards chosen rector of the college; and after the death of Pius IV. being seized with a spirit of devotion, he joined himself to Philip Neri, and accepted the office of secretary to the

Antivari
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Antoniano.

Antonides. the sacred college, offered him by Pius V. which he executed for 25 years with the reputation of an honest and able man. He refused a bishopric which Gregory XIV. would have given him; but he accepted the office of secretary to the briefs, offered him by Clement VIII. who made him his chamberlain, and afterwards a cardinal. Antoniano killed himself by too great fatigue: for he spent whole nights in writing letters; which brought on a sickness, whereof he died, in the 63^d year of his age. He wrote with such ease and fluency, that he never almost made any blot or rasure; and it is said of him, that he preserved the flower of his virginity during his whole life.

ANTONIDES VANDER GOES (John), an eminent Dutch poet, born at Goes, in Zealand, the 3^d of April, 1647. His parents were Anabaptists, people of good character, but of low circumstances. They went to live at Amsterdam when Antonides was about four years old; and, in the ninth year of his age, he began his studies, under the direction of Hadrian Junius and James Cocceius. Antonides took great pleasure in reading the Latin poets, and carefully compared them with Grotius, Heinsius, &c. By this means he acquired a taste for poetry, and enriched his mind with noble ideas. He first attempted to translate some pieces of Ovid, Horace, and other ancients; and, having formed his taste on these excellent models, he at length undertook one of the most difficult tasks in poetry, to write a tragedy: this was intitled *Trazil, or The Invasion of China*. Antonides, however, was so modest, as not to permit it to be published. Vondel, who was then engaged in a dramatic piece, which was taken also from some event that happened in China, read Antonides's tragedy; and was so well pleased with it, that he declared, if the author would not print it, he would take some passages out of it, and make use of them in his own tragedy. He accordingly did so; and it was reckoned much to the honour of Antonides, to have written what might be adopted by so great a poet, as Vondel was acknowledged to be by all good judges. Upon the conclusion of the peace between Great Britain and Holland, in the year 1697, Antonides wrote a piece, intitled *Bellona aan band*, i.e. "Bellona chained;" a very elegant poem, consisting of several hundred verses. He next wrote an ingenious heroic poem, which he intitled *The River Y* (the river on which Amsterdam is built).

Antonides's parents had bred him up an apothecary; but his remarkable genius for poetry soon gained him the esteem and friendship of several persons of distinction; and particularly of Mr Buifero, one of the lords of the admiralty at Amsterdam, and a great lover of poetry, who sent him at his expence to pursue his studies at Leyden, where he remained till he took his degree of doctor of physic, and then his patron gave him a place in the admiralty. In 1678, Antonides married Susanna Bernans, a minister's daughter, who had also a talent for poetry. His marriage was celebrated by several eminent poets, particularly by the famous Peter Francius, professor of eloquence, who composed some Latin verses on the occasion. After marriage, he did not much indulge his poetic genius; and within a few years he fell into a consumption, of which he died on the 18th September, 1684, being then but thirty-seven years and a few months old. He is esteemed the most eminent Dutch poet, after Vondel. His works

have been printed several times, having been collected Antoninus by his father Anthony Tanfz. The last edition was printed by Nicholas Ten Hoom, at Amsterdam, in the year 1714, in quarto, under the direction of David Van Hoogstraaten, one of the masters of the Latin school of that city, who added to it also the life of the poet.

ANTONINUS PIUS, the Roman emperor, was born at Lanuvium, in Italy, A. C. 86, of a family originally from Nîmes in Languedoc. His character was in all respects one of the noblest that can be imagined; and he had the title of *Pius* given him by the senate. We have no regular account of the transactions of his reign, since Capitolinus has written in a very confused manner; and we have only an abridgment of Dion Cassius's history by Xiphilin now remaining. He managed the public revenues with great frugality, yet was extremely generous; was fond of peace, and in war preferred the reputation of justice to all the advantages which might be gained by victory. He was more intent upon preserving the bounds of his empire, than extending them; and he often made use of Scipio's expression, That he chose rather to save one citizen than kill a thousand enemies. By this conduct he made himself universally esteemed and revered in that age, and admired by posterity. This great and good emperor died in 161, aged 75 years, having reigned 23.

ANTONINUS PHILOSOPHUS (Marcus Aurelius), the Roman emperor, born at Rome, the 26th of April, in the 121st year of the Christian æra. He was called by several names, till he was admitted into the Aurelian family, when he took that of Marcus Aurelius Antoninus. Hadrian, upon the death of Cejonius Commodus, turned his eyes upon Marcus Aurelius; but, as he was not then 18 years of age, and consequently too young for so important a station, he fixed upon Antoninus Pius, whom he adopted, upon condition that he should likewise adopt Marcus Aurelius. The year after this adoption, Hadrian appointed him questor, though he had not yet attained the age prescribed by the laws. After the death of Hadrian, Aurelius married Faustina, the daughter of Antoninus Pius, by whom he had several children. In the year 139, he was invested with new honours by the emperor Pius, in which he behaved in such a manner as endeared him to that prince and the whole people.

Upon the death of Pius, which happened in the year 161, he was obliged by the senate to take upon him the government, in the management of which he took Lucius Verus as his colleague. Dion Cassius says, that the reason of doing this was, that he might have leisure to pursue his studies, and on account of his ill state of health; Lucius being of a strong vigorous constitution, and consequently more fit for the fatigues of war. The same day he took upon him the name of Antoninus, which he gave likewise to Verus his colleague, and betrothed his daughter Lucilla to him. The two emperors went afterwards to the camp; where, after having performed the funeral rites of Pius, they pronounced each of them a panegyric to his memory. They discharged the government in a very amicable manner. It is said, that, soon after Antoninus had performed the apotheosis of Pius, petitions were presented to him by the pagan priests, philosophers, and governors of provinces, in order to excite him to persecute the Christians; which he rejected with indignation, and interposed

Antoninus. posed his authority for their protection, by writing a letter to the common assembly of Asia, then held at Ephesus (A). The happiness which the empire began to enjoy under these two emperors was interrupted, in the year 162, by a dreadful inundation of the Tiber, which destroyed a vast number of cattle, and occasioned a famine at Rome. This calamity was followed by the Parthian war; and at the same time the Catti ravaged Germany and Rhetia. Lucius Verus went in person to oppose the Parthians; and Antoninus continued at Rome, where his presence was necessary.

During this war with the Parthians, about the year 163 or 164, Antoninus sent his daughter Lucilla to Verus, the having been betrothed to him in marriage, and attended her as far as Brundisium: he intended to have conducted her to Syria; but it having been insinuated by some persons, that his design of going into the east, was to claim the honour of having finished the Parthian war, he returned to Rome. The Romans having gained a victory over the Parthians, who were obliged to abandon Mesopotamia, the two emperors triumphed over them at Rome, in the year 166; and were honoured with the title of *Fathers of their country*. This year was fatal, on account of a terrible pestilence which spread itself over the whole world, and a famine under which Rome laboured: it was likewise in this year that the Marcomanni, and many other people of Germany, took up arms against the Romans; but the two emperors having marched in person against them, obliged the Germans to sue for peace. The war, however, was renewed the year following, and the two emperors marched again in person; but Lucius Verus was seized with an apoplectic fit, and died at Altinum. The Romans were now defeated with great slaughter; and the emperor, not chusing to burden his subjects with new taxes, exposed to public sale the furniture of the palace, the gold and silver plate belonging to the crown, and his wife's rich garments embroidered with gold, and a curious collection of pearls, which Adrian had purchased during his long progress thro' the provinces of the empire, and was called *Adrian's cabinet*.

In the year 170, Antoninus made vast preparations against the Germans, and carried on the war with great vigour. During this war, in 174, a very extraordinary event is said to have happened, which, according to Dion Cassius, was as follows: Antoninus's army being blocked up by the Quadi, in a very disadvantageous place, where there was no possibility of procuring water; in this situation, being worn out with fatigue and wounds, oppressed with heat and thirst, and incapable of retiring or engaging the enemy, in an instant the sky was covered with clouds, and there fell a vast quantity of rain: the Roman army were about to quench their thirst,

when the enemy came upon them with such fury, that they must certainly have been defeated, had it not been for a shower of hail, accompanied with a storm of thunder and lightning, which fell upon the enemy, without the least annoyance to the Romans, who by this means gained the victory (B). In 175, Antoninus made a treaty with several nations of Germany. Soon after, Avidius Cassius, governor of Syria, revolted from the emperor: this insurrection, however, was put an end to by the death of Cassius, who was killed by a centurion named Anthony. Antoninus behaved with great lenity towards those who had been engaged in Cassius's party: he would not put to death, nor imprison, nor even sit in judgment himself upon any of the senators engaged in this revolt; but he referred them to the senate, fixing a day for their appearance, as if it had been only a civil affair. He wrote also to the senate, desiring them to act with indulgence rather than severity; not to shed the blood of any senator or person of quality, or of any other person whatsoever, but to allow this honour to his reign, that, even under the misfortune of a rebellion, none had lost their lives, except in the first heat of the tumult. In 176, Antoninus visited Syria and Egypt: the kings of those countries, and ambassadors also from Parthia, came to visit him. He staid several days at Smyrna; and, after he had settled the affairs of the east, went to Athens, on which city he conferred several honours, and appointed public professors there. From thence he returned to Rome with his son Commodus, whom he chose consul for the year following, though he was then but 16 years of age, having obtained a dispensation for that purpose. On the 27th of September, the same year, he gave him the title of *Imperator*; and on the 23^d of December, he entered Rome in triumph, with Commodus, on account of the victories gained over the Germans. Dion Cassius tells us, that he remitted all the debts which were due to himself and the public treasury during 46 years, from the time that Hadrian had granted the same favour, and burnt all the writings relating to those debts. He applied himself likewise to correct many enmities, and introduced several excellent regulations. In the year 179, he left Rome with his son Commodus, in order to go against the Marcomanni, and other barbarous nations; and the year following gained a considerable victory over them, and would, in all probability, have entirely subdued them in a very short time, had he not been taken with an illness, which carried him off on the 17th of March, 180, in the 59th year of his age, and 19th of his reign. The whole empire regretted the loss of so valuable a prince, and paid the greatest regard to his memory: he was ranked amongst the gods, and almost every person had a statue of him in their houses. His book of *Meditations* has been much admired

(A) Eusebius has preserved this letter, Hist. Eccles. lib. iv. cap. 13. but he falsely ascribes it to Antoninus Pius, whereas it was wrote by Marcus Antoninus, as Valerius makes it appear in his annotations on Eusebius.

(B) The pagans as well as Christians, according to Mr Tillamont (p. 621. art. xvi.), have acknowledged the truth of this prodigy, but have greatly differed as to the cause of such a miraculous event; the former ascribing it, some to one magician and some to another: In Antoninus's Pillar, the glory is ascribed to Jupiter the god of rain and thunder. But the Christians affirmed, that God granted this favour at the prayer of the Christian soldiers in the Roman army, who are said to have composed the twelfth or Melitene legion; and, as a mark of distinction, we are told that they received the title of the *Thundering Legion*, from Antoninus, (Euseb. Eccles. Hist. lib. v. cap. 5.). Mr Moyle, in the letters published in the second volume of his works, has endeavoured to explode this story of the Thundering Legion; which occasioned Mr Whitton to publish an answer, in 1726, intitled, *Of the Thundering Legion; or, Of the miraculous deliverance of Marcus Antoninus and his army, upon the prayers of the Christians*.

Antoninus's Wall. admired by the best judges.

ANTONINUS'S Wall, the name of the third rampart or defence that had been built or repaired by the Romans against the incursions of the North Britons. It is called by the people in the neighbourhood, *Graham's Dyke*; from the notion that one Graham, or Grimus, first made a breach in it after the retreat of the Romans out of Britain. The first barrier erected by the Romans was the chain of forts made by Agricola † from the frith of Forth to that of Clyde, in the year 81, to protect his conquests from the inroads of the Caledonians. The second was the vallum, or dyke, flung up by Adrian * in the year 121. It terminated on the western side of the kingdom, at *Axelodunum*, or *Brugh*, on the Solway sands; and was supposed to have reached no further than *Pons Ælii*, or *Newcastle*, on the eastern. But from an inscription lately discovered, it appears to have extended as far as the wall of Severus ‡. This rampart of Adrian's was situated much further south than Agricola's chain; the country to the north having been either, according to some authors, recovered by the native Britons after the departure of Agricola; or, according to others, voluntarily slighted by Adrian. However, this work of Adrian's did not long continue to be the extreme boundary of the Roman territories to the north in Britain. For Antoninus Pius, the adopted son and immediate successor of Adrian, having, by his lieutenant Lollius Urbicus, recovered the country once conquered by Agricola, commanded another rampart to be erected between the friths of Forth and Clyde, in the tract where Agricola had formerly built his chain of forts. The great number of inscriptions which have been found in or near the ruins of this wall, or rampart, to the honour of Antoninus Pius, leave us no room to doubt its having been built by his direction and command. If the fragment of a Roman pillar with an inscription, now in the college library of Edinburgh, belonged to this work, as it is generally supposed to have done, it fixes the date of its execution to the third consulship of Antoninus, which was A. D. 140, only 20 years after that of Adrian, of which this seems to have been an imitation. This wall or rampart, as some imagine, reached from Caer-ridden on the frith of Forth, to Old Kirkpatrick on the Clyde; or, as others think, from Kinniel on the east, to Dunglass on the west. These different suppositions hardly make a mile of difference in the length of this work, which, from several actual measurements, appears to have been 37 English or 40 Roman miles. Capitolinus, in his life of Antoninus Pius, directly affirms, that the wall which that emperor built in Britain was of turf. This in the main is unquestionably true; though it is evident (from the vestiges of it still remaining, which not very many years ago were dug up and examined for near a mile together) that the foundation was of stone. Mr Camden also tells us, from the papers of one Mr Anthony Pont, that the principal rampart was faced with square stone, to prevent the earth from falling into the ditch. The chief parts of this work were as follows: 1. A broad and deep ditch, whose dimensions cannot now be discovered with certainty and exactness, tho' Mr Pont says it was 12 feet wide. 2. The principal wall or rampart was about 12 feet thick at the foundation, but its original height cannot now be determined. This wall was situated on the south brink of the ditch. 3. A

† See Agricola.

* See Adrian.

‡ See Severus.

military way on the south side of the principal wall, well paved, and raised a little above the level of the ground. This work, as well as that of Adrian, was defended by garrisons placed in forts and stations along the line of it. The number of these forts or stations, whose vestiges were visible in Mr Pont's time, were 18, situated at about the distance of two miles from each other. In the intervals between the forts, there were turrets or watch-towers. But the number of these, and their distance from each other, cannot now be discovered.

It is not a little surprising, that though it is now more than 1600 years since this work was finished, and more than 1300 since it was slighted, we can yet discover, from authentic monuments, which are still remaining, by what particular bodies of Roman troops almost every part of it was executed. This discovery is made from inscriptions upon stones, which were originally built into the face of the wall, and have been found in or near its ruins, and are carefully preserved. The number of stones with inscriptions of this kind now extant, is 11: of which six may be seen at one view in the college of Glasgow, one in the college of Aberdeen, one in the college of Edinburgh, one in the collection of Baron Clerk, one at Cochnoch-house, and one at Calder-house. From these inscriptions it appears in general, that this great work was executed by the second legion, the vexillations of the sixth legion and of the twentieth legion, and one cohort of auxiliaries. If these corps were all complete, they would make in all a body of 7800 men. Some of these inscriptions have suffered greatly by the injuries of time and other accidents; so that we cannot discover from them with absolute certainty, how many paces of this work were executed by each of these bodies of troops. The sum of the certain and probable information contained in these inscriptions, as it is collected by the learned and illustrious Mr Horsley, stands thus:

	Paces.
The second legion built	11,603
The vexillation of the sixth legion	7,411
The vexillation of the twentieth legion	7,801
All certain	26,815
The vexillation of the twentieth legion, the monument certain, and the number probable	3,411
The same vexillation, on a plain monument, no number visible, supposed	3,500
The sixth legion, a monument, but no number, supposed	3,000
Cohors prima Cugernorum	3,000

Total 39,726

or 39 miles 726 paces, nearly the whole length of the wall. It would have been both useful and agreeable to have known how long time these troops were employed in the execution of this great work. But of this we have no information. Neither do we know what particular bodies of troops were in garrison in the several forts and stations along the line of this wall, because these garrisons were withdrawn before the *Notitia Imperii* was written.

Though we cannot discover exactly how many years this wall of the emperor Antoninus continued to be the

Antoninus's Wall.

Antonio.

Antonio,
Antonius.

the boundary of the Roman territories in Britain, yet we know with certainty that it was not very long. For we are told by an author of undoubted credit, that, in the reign of Commodus, A. D. 180, "he had wars with several foreign nations, but none so dangerous as that of Britain. For the people of the island, having passed the wall which divided them from the Romans, attacked them, and cut them in pieces."

ANTONIO (Nicholas), knight of the order of St James and canon of Seville, did great honour to the Spanish nation by his *Bibliothèque* of their writers. He was born at Seville, in 1617, being the son of a gentleman whom king Philip IV. made president of the admiralty established in that city in 1626. After having gone through a course of philosophy and divinity in his own country, he went to study law at Salamanca, where he closely attended the lectures of Francisco Ramos del Manzano, afterwards counsellor to the king, and preceptor to Charles II. Upon his return to Seville, after he had finished his law-studies at Salamanca, he shut himself up in the royal monastery of Benedictines, where he employed himself several years in writing his *Bibliotheca Hispanica*, having the use of the books of Bennet de la Sana, abbot of that monastery, and dean of the faculty of divinity at Salamanca. In the year 1659, he was sent to Rome by king Philip IV. in the character of agent-general from this prince: he had also particular commissions from the inquisition of Spain, the viceroys of Naples and Sicily, and the governor of Milan, to negotiate their affairs at Rome. The cardinal of Arragon procured him, from pope Alexander VII. a canonry in the church of Seville, the income whereof he employed in charity and purchasing of books: he had above 30,000 volumes in his library. By this help, joined to continual labour and indefatigable application, he was at last enabled to finish his *Bibliotheca Hispanica*, in four volumes in folio, two of which he published at Rome in the year 1672. The work consists of two parts; the one containing the Spanish writers who flourished before the 15th century, and the other those since the end of that century. After the publication of these two volumes, he was recalled to Madrid by king Charles II. to take upon him the office of counsellor to the crusade; which he discharged with great integrity till his death, which happened in 1684. He left nothing at his death but his vast library, which he had brought from Rome to Madrid; and his two brothers, and nephews, being unable to publish the remaining volumes of his *Bibliotheca*, sent them to cardinal d'Aguine, who paid the charge of the impression, and committed the care thereof to Monsieur Marti, his librarian, who added notes to them, in the name of the cardinal.

ANTONIO (St), one of the Cape de Verd islands, lying in E. Long. o. 26. N. Lat. 18. 10. It is separated from St Vincent's by a clear navigable channel two leagues in breadth. On the north side, it has a good road for shipping, with a collection of fresh water rising from springs, which, however, scarcely merits the name of a pond. The island stretches from north-east to south-west, and is filled with mountains; one of which is of so extraordinary a height, as to be compared with the Peak of Teneriffe: Its top is constantly covered with snow, and notwithstanding the clearness of the sky, is generally hid in clouds. Here are pro-

duced a variety of fruits; oranges, lemons, palms, melons, &c. and some sugar-canes. The potatoes and melons are particularly excellent, and are much sought after by mariners. But, notwithstanding all this plenty, the inhabitants live in the most wretched poverty. They are in number about 500, chiefly negroes, under the protection of the Portuguese, whose language they speak, and imitate their manners. To the north-west stands a village, containing about 20 huts, and at least 50 families, under the direction of a governor, or, as they call him, a *captain*; a priest, and a schoolmaster. The latter trains up the children in the Christian religion, and the first principles of knowledge; which, however, seldom exceeds the being able to read the bible in a bungling manner.

ANTONIO (St), a Dutch fort in Axim, on the gold coast of Africa. It stands on a high rock, which projects into the sea in form of a peninsula; and is so environed by rocks and dangerous shoals, as to be inaccessible to an enemy but by land, where it is fortified by a parapet, draw-bridge, and two batteries of heavy cannon. Besides this it has a battery towards the sea. The three batteries consist of 24 cannon. Its form is triangular; the building is neat, strong, and commodious for the extent, that being but small, on account of the narrowness of the rock on which it is built. The garrison is usually composed of 25 white men, and an equal number of negroes, under the command of a sergeant. It is maintained at the expence of the West-India Company; and, when well stored with provisions, is capable of making a long defence against any number of negroes. It is, however, as well as all other forts on this coast, liable to inconveniences from the heavy and continual rains, which damage the walls, and render frequent reparations necessary. This obliges the Dutch always to keep ready a quantity of lime or cement made of calcined oyster-shells, of which the coast produces great numbers.

This settlement was first founded by the Portuguese during the reign of Emanuel. They fixed at first upon a small point; where finding themselves insecure, they built the fort where it now stands. They were driven out by the Dutch in 1642; and, upon the conclusion of a peace with the States-General, the fort remained by treaty in the hands of the Dutch West-India Company, who have kept possession of it ever since.

ANTONIUS (Marcus), a famous Roman orator. While he filled the office of prætor, Sicily fell to his lot, and he cleared the seas of the pirates which infested that coast. He was made consul with A. Posthumus Albinus, in the year of Rome 653; when he opposed the turbulent designs of Sextus Titus, tribune of the people, with great resolution and success. Some time after, he was made governor of Cilicia, in quality of proconsul; where he performed so many great exploits, that he obtained the honour of a triumph. We cannot omit observing, that, in order to improve his great talent for eloquence, he became a scholar to the greatest men at Rhodes and Athens, in his way to Cilicia, and when on his return to Rome. Soon after, he was appointed censor; which office he discharged with great reputation, having carried his cause before the people, against Marcus Duronius, who had preferred an accusation of bribery against him, in revenge for Antonius's having erased his name out of the list of senators.

Antoni- nators, which this wife cenfor had done, becaufe Du-
 ronius, when tribune of the people, had abrogated a
 law which reſtrained immoderate expence in feaſts. He
 was one of the greateſt orators ever known at Rome;
 and it was owing to him, according to the teſtimony of
 Cicero, that Rome might boaſt herſelf a rival even to
 Greece itſelf in the art of eloquence. He defended, a-
 mongſt many others, Marcus Aquilius; and moved the
 judges in fo ſenſible a manner, by the tears he ſhed,
 and the fears he ſhewed upon the breaſt of his client,
 that he carried his cauſe. He never would publiſh any
 of his pleadings, that he might not, as he ſaid, be
 proved to ſay in one cauſe, what might be contrary to
 what he ſhould advance in another. He affected to be
 a man of no learning. His modeſty, and many other
 qualifications, rendered him no leſs dear to many per-
 ſons of diſtinction, than his eloquence made him uni-
 verſally admired. He was unfortunately killed dur-
 ing thoſe bloody confuſions raiſed at Rome by Marius
 and Cinna. He was diſcovered in the place where he
 hid himſelf, and ſoldiers were ſent to diſpatch him;
 but his manner of addreſſing them had ſuch an effect,
 that none but he who commanded them, and had not
 heard his diſcourſe, had the cruelty to kill him. His
 head was expoſed before the roſtra, a place which he
 had adorned with his triumphal ſpoils. This happen-
 ed 90 years before the Chriſtian æra.

ANTONIUS (Marcus) the triumvir, grandſon to
 the former, was very handſome in his youth; for which
 reaſon he was greatly beloved by Curio a ſenator, who,
 by carrying him about in all his debaucheries, made him
 contract ſuch heavy debts, that his own father forbade
 him his houſe. Curio, however, was fo generous as to
 bail him for 250 talents. When the civil war broke
 out, Curio took Cæſar's party, and prevailed with An-
 tonius to do the ſame; for which he was made a tribune
 of the people, and in that office did Cæſar great ſer-
 vice. Cæſar, having made himſelf maſter of Rome, gave
 Antonius the government of Italy: at the battle of
 Pharfalia, Cæſar conſided ſo much in him, that he gave
 him the command of the left wing of his army, whiſt
 he himſelf led the right. After Cæſar was made dic-
 tator, he made Antonius general of the horſe, though
 he had never been prætor; in which command he ex-
 erted his power with the utmoſt violence. He was made
 conſul, when Cæſar enjoyed that honour for the fifth
 time, the laſt year of that uſurper's life. On Cæſar's
 death he harangued the populace with great art, and
 raiſed their fury againſt his murderers; flattering him-
 ſelf that he ſhould eaſily get into the place which Cæſar
 had filled: but his haughty behaviour made him loſe
 all the advantages his affected concern for Cæſar
 had gained him. His ill treatment of Octavius, and
 quarrel with him, produced another civil war; which
 ended in an accommodation between him, Octavius, and
 Lepidus, fatal to the peace of Rome. They agreed to
 ſhare the ſupreme power among them; and many of the
 moſt illuſtrious Romans were ſacrificed by proſcription
 to cement this bloody league, which is known by the
 name of the *Second Triumvirate*. But the triumvirs
 were too ambitious, and hated one another too much,
 to be long united. Antonius went into Aſia to raiſe
 money for his ſoldiers; during his abſence, Fulvia hiſ
 wife quarrelled with Octavius. When Antonius was in
 Aſia, indulging himſelf in all manner of luxury, the fa-

mous Cleopatra inſpired him with the moſt violent paſ-
 ſion. Hearing of the quarrel between Fulvia and Octa-
 vius, and finding Octavius was become publicly his
 enemy, Antonius entered into a confederacy with Sex-
 tus Pompeius, who was ſtill maſter of Sicily. He then
 went into Italy in order to fight Octavius; but Fulvia,
 who had been the author and promoter of this war,
 dying, Octavius and Antonius came to an agreement.
 One of the conditions of this new peace was, that they
 ſhould together attack Pompey, though the former had
 lately made an alliance with him. Antonius then mar-
 ried Octavia, ſiſter to Octavius, as a pledge of their re-
 newed friendſhip; but returned ſoon after to hiſ be-
 loved Cleopatra, and again lived with her in Alexandria.
 Octavius took hold of this pretence to inveigh againſt
 him, and begin the war again. At laſt they engaged
 in a ſea-fight at Actium, in which Octavius gained a
 complete victory; which was followed by the deaths
 both of Antonius and Cleopatra. The inſatuated An-
 tonius fell upon his own ſword; and Cleopatra ſtung
 herſelf to death with an aſp, as was ſuppoſed, to avoid
 gracing the victor's triumph at Rome.

ANTONOMASIA, a form of ſpeech, in which,
 for a proper name, is put the name of ſome dignity,
 office, profeſſion, ſcience, or trade; or when a proper
 name is put in the room of an appellative. Thus a
 king is called *hiſ majeſty*; a nobleman, *hiſ lordſhip*.
 We ſay the *philophoſopher* inſtead of Aristotle, and the *ora-
 tor* for Cicero: Thus a man is called by the name of
 hiſ country, a *German*, an *Italian*; and a grave man
 is called a *Cato*, and a wife man a *Solomon*.

ANTRIM, the moſt northerly county of Ireland.
 It is bounded by that of Down on the fourth-eaſt,
 that of Londonderry on the weſt, from which it is ſe-
 parated by the river Bann, part of Armagh on the
 ſouth, St George's channel on the eaſt, and the Den-
 caledonian ocean on the north. Its greateſt length is
 about 46 miles, its greateſt breadth about 27; and the
 number of acres it contains, plantation-measure, are
 computed at 383,000. Though the country is much
 incumbered with bogs and marſhes, yet it enjoys a
 pretty good air, and is well peopled, chiefly with pro-
 teſtants. Where it is free from bogs the ſoil is fruit-
 ful. It ſends two members for the ſhire, and two for
 each of the following towns, *viz.* Liſburn, Belfaſt,
 Antrim, and Randalſtown.

Certain narrow valleys, called *ghlys*, beginning here,
 and running a great way along the coaſt, belonged
 formerly to the Biſſets, noblemen of Scotland, who, ha-
 ving been obliged to quit that country for having aſſaſ-
 ſinated Patrick earl of Athol upon a private quarrel,
 came hither, and had a great eſtate beſtowed upon them
 by Henry III. of England; of which, in the reign of
 Edward II. a part was forfeited by the rebellion of
 Hugh, then chief of the family. Another tract near
 this, called the *Rowtze*, belonged anciently to the Mac-
 guillers, but now to the Mc'Donnells, earls of Antrim.

Upon the coaſt of this country are the promontories
 called by Ptolemy, *Robogdium*, *Vennicinium*, and *Boræum*,
 now *Fair-Foreland*, *Ramshead*, and *St Helen's-head*.
 The river alſo, ſtyled by the ſame author *Vidua*,
 and now *Croagh*, runs thro' this country.—
 Here alſo is the remarkable natural curioſity called the
Giant's-cauſeway; for a particular deſcription of which
 ſee that article.

ANTRIM,

Antono-
 maſia,
 Antrim.

Antrim
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Antwerp.

ANTRIM, the capital town of the county of Antrim, in Ireland, feated at the north end of the lake Lough-Neagh. It is but a poor place, 13 miles west of Carrickfergus. W. Long. 6. 26. N. Lat. 54. 45. It fends two members to parliament.

ANTRUM, among anatomists, a term used to denote several cavities of the body : as the *antrum highmorianum*, or that in the maxillary or jaw-bone ; *antrum pylori*, or that at the bottom of the pylorus, &c.

ANTWERP, a city of the duchy of Brabant, in the Austrian Netherlands, capital of the marquisate of Antwerp, otherwise called the *marquisate of the holy Roman empire*, situated in E. Long. 4. 15. N. Lat. 51. 12. It lies in a low marshy ground on the Scheld, 25 miles from Brussels to the north. It is the third city in rank in Brabant, large and well built, containing 22 squares, and above 200 streets, all straight and broad, especially that called the *Mere*, in which six coaches can go abreast. Most of the houses are of free-stone, and have an air of antiquity, being high, with courts before and gardens behind. At the head of the Mere is a crucifix of brass thirty-three feet high. The cathedral dedicated to the Virgin Mary, the *fiacht-houfe*, and the exchange, are magnificent structures : the latter is the first building of that kind in Europe, and on its model the exchanges of London and Amsterdam are built : its pillars are all of blue marble, and carved, but all in a different manner. The exchange cost the city 300,000 crowns. Antwerp, towards the end of the fifteenth century, was one of the most celebrated towns that ever existed. The Scheld, on which it stands, being 20 feet at low water, and rising 20 feet more at flood, ships of the greatest burden came up to the keys, as in the river Thames at London ; but when the United Provinces formed themselves into a free state, after having shaken off the yoke of Spain, they got the entire command of the navigation of the Scheld ; which ruined the trade of Antwerp, and transferred it to Amsterdam. This made the inhabitants turn their heads to painting, jewellery, and banking, which they have continued to this day, with great success and reputation : for at Antwerp bills of exchange may be negotiated for any sum to any part of Europe ; and in the war before the last, two brothers of the name of de Koning, paid the one the army of France, and the other that of the confederates. Besides, here is a fine manufacture of tapestry and lace ; and, for the promoting of trade, an insurance-company has been erected. This city is the see of a bishop, who, as abbot of St Bernard, is the second prelate in Brabant. The bishopric is of great extent, and the cathedral a most noble pile, with one of the finest steeples in the world. The emperor Charles V. when he made his entry into Antwerp, said it ought to be put in a case, and shewed only once a-year for a rarity. The house of the hanse-towns, built when the city was in its flourishing condition, is a lately building, with magazines above for dry goods, and cellars below for wet, and in the middle story were 300 lodging rooms for merchants ; but now it is turned to a horse-barack. There is a market here called the *Fridays market*, because it is held every Friday, where all sorts of household goods, pictures, and jewels, are sold by auction. No city in the Netherlands has so many and so fine churches as this. Many of them, particularly

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the cathedral and Jesuits church, are adorned with paintings, by Sir Peter Paul Rubens, who was a native of this city ; and by Quintin Maffei, who is said to have been a blacksmith ; but having fallen in love with a painter's daughter, and been told by her father, when he asked her of him in marriage, that he would have none but a painter for his son-in-law, he went to Italy to study painting, and, in a few years, returned so eminent in his new profession, that he found no difficulty in obtaining the father's consent. He is interred at the entry of the cathedral, where his effigy is put up, with an inscription, signifying, that conjugal love made an Apelles of a blacksmith. The above-mentioned Jesuits church is extremely magnificent, and the chapel of the Virgin, joining to it, still more so. Among the cloisters the most remarkable are, the noble and rich abbey of St Michael, on the banks of the Scheld, the apartments of which are truly royal, and in which all sovereign princes that pass this way actually lodge ; and the English nunnery, of the order of St Teresa, the nuns of which never wear linen, nor eat flesh, and lie upon straw : the grates of the convent are so dismal, that it looks like a prison. As to the fortifications of the city, it is environed with a fine wall, planted with rows of trees on each side, with walks between, broad enough for two coaches to go abreast, being also defended by a very strong, large, regular citadel, in form of a pentagon, erected by the duke of Alva in 1568, which commands the town, and the neighbouring country. The magistracy of this city is chosen only out of the seven patrician families ; and consists of two burgomasters, and 18 echevins, besides inferior magistrates. Among the privileges granted to it by its princes, there is one by which every person born in it is a citizen, though both his father and mother were foreigners.

In 1585, Antwerp underwent a remarkable siege by the duke of Parma. It was then the most wealthy city in the Netherlands, and had long been the object of his designs ; but the difficulties attending the enterprise obliged him to postpone it for a considerable time. In order to succeed, it was necessary to cut off the communication of the city with Holland, Ghent, and all places above and below Antwerp on the Scheld. To effect this, he laid siege to Liefkenshouk and Tillo, places of the utmost consequence to the security and commerce of the city : both were ultimately defended ; and the siege of the latter was raised, after it had been carried on for three months : however, the duke gained several other posts on the river, where he built forts, and greatly annoyed the shipping and trade of the city. He next laid siege to Dendermonde, in order to cut off the communication with Ghent, in which he succeeded by the reduction of the town. His next attempt was on Vilvorde : this place he took by assault, and thereby cut off the communication with Brussels. Finding, however, this method of hemming in the city tedious, and ineffectual while an opening to the mouth of the river remained, he formed a design of building a bridge across the Scheld, the extremities of which were to be defended by strong forts and out-works. He began with collecting great quantities of wood at Callo and fort St Philip, where he intended the bridge should be built ; but his project was for some time retarded by the Antwerpens, who broke down the dykes, overflowed

Antwerp.

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the whole country, and carried off his magazines by the inundation. Not discouraged by this loss, he applied himself diligently to repair it, and with incredible expedition cut a canal from Steken to Callo, by which he carried off the waters. He then set to work upon the bridge, and finished it in seven months, without any interruption from the Zealanders. During the building of this bridge, Aldegonde, governor of Antwerp, proposed building a fort on Couventleyn dyke, in order to secure that important post, and then breaking down the dyke, when the bridge was near finished: but he was violently opposed by certain citizens, who apprehended that their lands and villas would be destroyed by the inundation. This unseasonable opposition, with the negligence of the magistrates, who, because the markets were high, had not laid in a sufficient stock of corn, occasioned the loss of the city. However, in despite of all the duke of Parma's precautions, the Zealanders found means to throw in a convoy of corn: but the citizens, knowing they would not run the risk of carrying it back again, so cheapened the price, that these bold traders refused ever to bring their goods again to so bad a market. The Antwerpers, having thus through avarice brought on their ruin, began in a short time to suffer by famine; they then pressed the Zealanders to attempt something for their relief, but it was now too late. While the magistrates were deliberating on some means for destroying the bridge, which they might have prevented from being ever completed, one Ginebelli, a Mantuan engineer, offered his services, undertaking at a certain expence to blow it into the air. Even in this extremity the expence was grudged: but necessity at last overcame this obstacle; Ginebelli was furnished with two large vessels, a number of small boats, and every thing necessary. He formed the two large vessels into fire-ships, which he set adrift with the stream, deceiving the enemy by means of false fires lighted up in the fleet of small boats. The train of one of the fire-ships was expended before the time expected, and the blew up with a terrible explosion, but with little damage to the bridge. The other was more successful, carrying off all the outworks, setting fire to the whole bridge, and burying above 500 soldiers in the ruins it made. The fire however was soon extinguished, and the bridge repaired by the duke of Parma, while the Antwerpers were prevented by avarice from repeating the experiment; so that they were soon reduced to the greatest straits, and obliged to surrender. It is said that the city of Amsterdam had obstructed every measure for the relief of Antwerp, hoping to profit by its destruction. It was not doubted but the protestants would forsake it as soon as it fell into the hands of an arbitrary catholic prince; and this conjecture was soon fulfilled by the removal of many families with their effects to Amsterdam.—After the battle of Ramillies, the city of Antwerp surrendered to the duke of Marlborough. It was taken by the French in 1746, but restored to the house of Austria at the treaty of Aix-la-Chapelle.

ANXUR, a city of the Volsci, (Pliny, Livy), in Latium; called *Tarracina*, by the Greeks and Latins: now *Terracina*; situated on an eminence, (Livy, Horace, Sil. Italicus). *Anxurati*, a citizen of Anxur, (Livy). And the epithet, *Anxurus*, a name of Jupiter, worshipped without a beard at Anxur, (Virgil). Though

others read *Axurus*, or *Axyrus*, without a razor. E. Long. 14. 5. Lat. 41. 18.

AONIDES, in mythology, one of the many appellations of the mufes; so called from Aonia, a part of ancient Bœotia.

AORASIA, in antiquity, the invisibility of the gods. The word is Greek, *αορασια*, and derived from *αο*, priv. and *ορα*, to see. The opinion of the ancients with regard to the appearance of the gods to men, was, that they never shewed themselves face to face, but were known from their backs as they withdrew. Neptune assumed the form of Calchas to speak to the two Ajaxes; but they knew him not till he turned his back to leave them, and discovered the god by his majestic step as he went from them. Venus appeared to Æneas in the character of a huntress: but her son knew her not till she departed from him; her divinity was then betrayed by her radiant head, her flowing robe, and her majestic pace.

AORIST, among grammarians, a tense peculiar to the Greek language, comprehending all the tenses; or rather, expressing an action in an indeterminate manner, without any regard to past, present, or future.

AORISTIA, in the sceptic philosophy, denotes that state of the mind wherein we neither assert nor deny any thing positively, but only speak of things as seeming or appearing to us in such a manner. The aoristia is one of the great points or terms of scepticism, to which the philosophers of that denomination had continual recourse by way of explication, or subterfuge. Their adversaries, the Dogmatists, charged them with dogmatizing, and asserting the principles and positions of their sect to be true and certain.

AORNUS, a very high rock of India, having its name from its extraordinary height, as being above the flight of a bird. Its circuit was about 25 miles, its height 11 furlongs, and the way leading up to the top artificial and narrow. At the bottom, on one side, ran the river Indus; on the top was a fine plain, part of which was covered with a thick wood; the rest arable land, with a fountain furnishing abundance of excellent water. This rock was taken by Alexander the Great, in whose time there was a report that Hercules had attempted it in vain; however, according to Arrian, this report was without foundation. It is probable indeed, that it was raised after the place was taken, in order to magnify Alexander's exploit. While the Macedonian monarch was preparing all things necessary for the siege, an old man with his two sons, who had long lived in a cave near the summit, came and offered to shew him a private way of ascending. This being readily accepted, Ptolemy, with a considerable body of light-armed troops, was dispatched with them, with orders, in case they succeeded, to entrench themselves strongly upon the rock, in the wood to which the old man was to direct them, before they ventured to attack the Indians. Ptolemy exactly executed his orders; and gave notice by a lighted torch set upon a pole, that he had got safely up. Upon this, Alexander gave immediate orders for a body of troops to attempt the passage by which the rock was commonly ascended; but they were repulsed with great slaughter. He then sent an Indian with letters to Ptolemy, desiring him, the next time an attack was made by the common way, to fall upon the enemy behind. But in the mean time, those who de-

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Aornus.

ended

Aorta
Apædeusia.

fended the rock attacked Ptolemy with great vigour; but were at last repulsed, though with much difficulty: but the next day, when Alexander renewed the attack, though Ptolemy attacked the Indians in the rear, the Macedonians were repulsed on both sides. At last the king, perceiving that the strength of the Indians lay in the straits and declivity of the way by which they were attacked, caused a great quantity of trees to be felled, and with them filled the cavities between the plain on which the Indians were encamped, and the highest of his own advanced posts. The Indians at first derided his undertaking; but at length perceiving the adour with which the work was carried on, and having felt the effects of the missile weapons of the Macedonians, they sent deputies to propose terms of capitulation. Alexander, suspecting that their design was only to amuse him till they made their escape, withdrew his guards from the avenues. As soon as he knew the Indians were defended, he, with 700 of Ptolemy's light-armed foot, took possession of the deserted rock, and then made a signal for his forces to fall upon the flying Indians. They setting up a loud shout, so terrified the fugitives, that numbers of them fell from the rocks and precipices, and were dashed to pieces, while the greatest part of the remainder were cut off in the roads.

AORTA, in anatomy, the great artery which rises immediately from the left ventricle of the heart, and is from thence distributed to all parts of the body. It is divided into two grand trunks, distinguished by the epithets *ascending* and *descending*. See ANATOMY, n° 387.

AOUSTA, or AOSTA, a town of Italy, in Piedmont, and capital of the duchy of the same name, a bishop's see, and subject to the king of Sardinia. It is remarkable for several monuments of the Romans, and for the birth of Anselm archbishop of Canterbury. It is seated at the foot of the Alps, on the river Doria. E. Long. 7. 33. N. Lat. 45. 38.

AOUSTA, a territory of Piedmont, with the title of a duchy. It is a valley 30 miles in length, and extends from the pass of St Martin's, near the frontiers of Yvree, to St Bernard. It abounds in pastures, and all sorts of fruits; the capital is of the same name.

APACHES, a people of New Mexico in North America. They are brave, resolute, and warlike, fond of liberty, and the inveterate enemies of tyranny and oppression. Of this disposition the Spaniards had fatal experience towards the end of the last century, when they revolted against the Catholic king, massacred several of his officers, and committed the greatest devastations. Ever since, they have remained the allies, not the subjects, of the Spaniards; and the viceroy of Mexico has been obliged to maintain a more formidable garrison, and a greater number of troops.

APÆDEUSIA, denotes ignorance or unskilfulness in what relates to learning and the sciences. Hence also persons un instructed and illiterate are called *apædeusæ*. The term *apædeusæ* was particularly used among the French in the time of Huet; when the men of wit at Paris were divided into two factions, one called by way of reproach *apædeusæ*, and the others *eruditi*. The *apædeusæ* are represented by Huet, as persons who, finding themselves either incapable or unwilling to undergo a severe course of study in order to become truly learned, conspired to decry learning, and turn the

knowledge of antiquity into ridicule, thus making a merit of their own incapacity. The *apædeusæ* in effect were the men of pleasure; the *eruditi* the men of study. The *apædeusæ* in every thing preferred the modern writers to the ancient, to supersede the necessity of studying the latter. The *eruditi* derided the moderns, and valued themselves wholly on their acquaintance with the ancients.

APAGOGUE, in logic. See ABDUCTION.

APAGOGUE, in the Athenian law, the carrying a criminal taken in the fact, to the magistrate. If the accuser was not able to bring him to the magistrate, it was usual to take the magistrate along with him to the house where the criminal lay concealed, or defended himself.

APAGOGUE, in mathematics, is sometimes used to denote a progress or passage from one proposition to another; when the first having been once demonstrated, is afterwards employed in the proving of others.

APAGOGICAL DEMONSTRATION, an indirect way of proof, by shewing the absurdity of the contrary.

APALACHIAN MOUNTAINS, more properly called the *Aligany Mountains*, have their southern beginning near the bay of Mexico, in the Latitude of 30°, extending northerly on the back of the British colonies, and running parallel with the sea-coast to the Latitude of 40° North; but their distance from the sea, on the well, is not exactly known, though it is generally thought to be above 200 miles. A great part of these mountains are covered with rocks, some of which are of a stupendous height and bulk; the soil between them is generally black and sandy, but in some places differently coloured, composed of pieces of broken rock and spar, of a glittering appearance, which seem to be indications of minerals and ores if proper search was made for them. Chestnuts and small oaks are the trees that principally grow on these mountains, with some *chinkapin* * and other small shrubs. The grass is thin, mixed with vetch and small pease; and in some places there is very little vegetable appearance.

The rocks of the Apalachian mountains seem to engross one half of the surface. They are mostly of a light grey colour: some are of a coarse-grained marble like alabaster; others, of a metallic lustre: some pieces are in the form of slate, and brittle; others in lumps, and hard; and some appear with spangles, or covered over with innumerable small shining specks, like silver. These frequently appear at the roots of trees when blown down. The different spars are found most on the highest and steepest parts of the hills, where there is little grass and few trees; but the greatest part of the soil between the rocks is generally a dark sandy-coloured kind of mould, and shallow; yet fertile, and productive of good corn, which encourages the Tallapooses, a clan of the Cherokee Indians, to settle among them in Latitude 34°; and they are the only Indian nation that has a constant residence upon these mountains.

APAMEA, or APAMIA, a city of Bithynia, formerly called *Myrlea*, from Myrles, general of the Colophonians: destroyed by Philip, father of Perseus; and given to his ally Prusias, who rebuilt it, and called it *Apamea*, from the name of his queen Apama, (Strabo). Stephanus says, that Nicomedes Epiphanes, son of Prusias, called it after his mother; and that it had its an-

Apagoge
||
Apamea.

* Fagus pu-
mila. See
Fagus.

Apanage
||
Apaturia.

cient name from Myrlea, an Amazon. The Romans led a colony thither, (Strabo); called *Colonia Apamea*, (Pliny, Appian). The gentilitious name is *Apameus*, and *Apamensis*, (Trajan in a letter to Pliny).—Another *Apamea*, called *Cibotos*, of Phrygia, at some distance from the Meander, (Agathodæmon); but by a coin of Tiberius, on the Meander. The name is from *Apame*, mother of Antiochus Soter, the founder, and the daughter of Artabazus, (Strabo). The rise, or at least the increase, of *Apamea*, was owing to the ruins of *Celene*. The inhabitants are called *Apamienfes*, (Tacitus).—A third, on the confines of Parthia and Media, furnished *Raphane*, (Strabo, Pliny).—A fourth *Apamea*, a town of Mesene, an island in the Tigris, (Pliny, Ammian); where a branch of the Euphrates, called the *Royal river*, falls into the Tigris, (Ptolemy). A fifth in Mesopotamia, on the other side the Euphrates, opposite to Zeugma on this side, both founded by Seleucus, and joined by a bridge, from which the latter takes its name, (Pliny, Isidor, Characenus).—A sixth *Apamea*, now *Amamia*, also in Syria, below the confluence of the Orontes and Marfyas; a strong city, and situated in a peninsula, formed by the Orontes and a lake: it was a place of such plenty, that Seleucus, the founder of it, there maintained 500 elephants, (Strabo).—*Apamea* was also the ancient name of *Pella*, in the Decapolis.

APANAGE, or APFENNAGE, in the French customs, lands assigned by a sovereign for the subsistence of his younger sons, which revert to the crown upon the failure of male issue in that branch to which the lands are granted.

APANOMIA, a town of Santorin, an island in the Mediterranean sea, called in this part, by some, the *Sea of Candia*: it has a spacious harbour, in the form of a half-moon; but the bottom is so deep, that ships cannot anchor there. E. Long. 25. 59. N. Lat. 36. 18.

APANTHROPY, in medicine, denotes a love of solitude, and aversion for the company of mankind. *Apanthropy* is by some reckoned among the symptoms, by others among the species or degrees, of melancholy; and also passes for an ill indication in leucophlegmatic cases.

APARINE, in botany, a synonyme of the utricularia and several other plants.

APARITHMESIS, in rhetoric, denotes the answer to the protasis or proposition itself. Thus, if the protasis be, *Appellandi tempus non erat*,—the aparithmesis is, *At tecum anno plui vixi*.

APARTISMENUS, in the ancient poetry, an appellation given to a verse, which comprehended an entire sense or sentence in itself. This is sometimes also written, *apartemenus*, i. e. suspended, as not needing any following verse.

APATHY, among the ancient philosophers, implied an utter privation of passion, and an insensibility of pain. The word is compounded of *a priv.* and *πάθος*, affection. The Stoics affected an entire apathy: they considered it as the highest wisdom to enjoy a perfect calmness or tranquillity of mind, incapable of being ruffled by either pleasure or pain. The primitive Christians used the word to express a contempt for the things of this world.

APATURIA, in antiquity, a solemn feast celebrated by the Athenians in honour of Bacchus. It lasted

four days: the first day, those of the same tribe made merry together; and this they called *δορμια*. The second day, which they called *ανερσεις*, they sacrificed to Jupiter and Minerva. The third day, which they called *κρησεις*, such of their young men and maids as were of age were admitted into their tribes. The fourth day they called *κρησεις*.

APAULIA, in antiquity, the third day of a marriage solemnity. It was thus called, because the bride, returning to her father's house, did *απαυλιζετο* *το νυμφικον*, lodge apart from the bridegroom. Some will have the *apaulia* to have been the second day of the marriage, viz. that wherein the chief ceremony was performed; thus called by way of contradistinction from the first day, which was called *προαυλια*. On the day called *απαυλια* (whenever that was), the bride presented her bridegroom with a garment called *απαυληγρια*.

APE, in zoology, the general English name of a very numerous race of animals, the natural history of which is given at large under the article SIMIA: comprehending *Apes* properly so called, or such as want tails; and *Monkeys* and *Baboons*, or such as have tails, the former long, and the other short, ones. See SIMIA.

APELITES, Christian heretics in the second century, who affirmed that Christ received a body from the four elements, which at his death he rendered back to the world, and so ascended into heaven without a body.

APELLA, among physicians, a name given to those, whose prepuce is either wanting, or shrunk, so that it can no longer cover the glands. Many authors have supposed this sense of the word *Apella* warranted from the passage in Horace, *credat Judeus Apella, non ego*. But, according to Salmassius and others, *Apella* is the proper name of a certain Jew, and not an adjective signifying *circumcised*.

APELLES, one of the most celebrated painters of antiquity. He was born in the ile of Cos, and flourished in the time of Alexander the Great, with whom he was in high favour. He executed a picture of this prince, holding a thunderbolt in his hand: a piece, finished with so much skill and dexterity, that it used to be said there were two Alexanders; one invincible, the son of Philip; the other inimitable, the production of Apelles. Alexander gave him a remarkable proof of his regard: for when he employed Apelles to draw Campaie, one of his mistresses, having found that he had conceived an affection for her, he resigned her to him; and it was from her that Apelles is said to have drawn his *Venus Anadyomene*.

One of Apelles's chief excellencies was his making his pictures so exactly resemble the persons represented; inasmuch that the physiognomists are said to have been able to form a judgment as readily from his portraits as if they had seen the originals. His readiness and dexterity at taking a likeness was of great service to him, in extricating him from a difficulty in which he was involved at the court of Egypt: He had not the good fortune to be in favour with Ptolemy; a storm forced him, however, to take shelter at Alexandria, during the reign of this prince: a mischievous fellow, in order to do him a dislike, went to him, and in the king's name invited him to dinner. Apelles went; and seeing the king in a prodigious passion, told him, by way of excuse, that he should not have come to his table but by his orders. He was commanded to shew the

Apaulia
||
Apelles.

Apene
||
Apenzel.

the man who had invited him; this was impossible, the person who had put the trick upon him not being present: Apelles, however, drew a sketch of his picture upon the wall with a coal, the first lines of which discovered him immediately to Ptolemy.

Apelles left many excellent pictures, which are mentioned with great honour by the ancients; but his Venus Anadyomene is reckoned his master-piece. His Antigonos has also been much celebrated; this was drawn with a side-face, to hide the deformity of Antigonos, who had lost an eye. His picture of Calumny has also been much taken notice of; and he is said to have painted a horse so naturally, that horses neighed when they saw it.

APENE, in antiquity, a kind of chariot wherein the images of the Gods were carried in procession on certain days, attended with a solemn pomp, songs, hymns, dancing, &c. It was very rich, made sometimes of ivory, or of silver itself, and variously decorated.

APENNINUS, now the *Apennine*, a mountain, or ridge of mountains, running thro' the middle of Italy, from north-west to the south-east for seven hundred miles, in the form of a crescent, (Pliny); beginning at the Alps in Liguria, or the Riviera di Genoa; and terminating at the strait of Messina, or at Reggio, and the promontory Leucopetra; and separating, as by a back or ridge, the Adriatic from the Tuscan sea, (Pliny, Strabo, Ptolemy, Polybius, Vitruvius). This mountain, though high, is greatly short of the height of the Alps. Its name is Celtic, signifying a *high mountain*.

APENRADE, a town of Denmark, in the duchy of Slefwick, seated at the bottom of a gulph in the Baltic sea, between Flenfbourg and Hadschleben. It is 25 miles north from Slefwick. E. Long. 9. 28. N. Lat. 55. 4.

APENZEL, a town of Switzerland, in the canton of the same name, seated on the river Cluz, E. Long. 9. 1. N. Lat. 47. 31. The canton itself, which was allied to the others in 1513, consists only of three or four valleys; having the town and abbey of St Gall on the north; the county of Toggenburg on the west; the lordship of Sax in the canton of Zurich, and that of Gams in the canton of Schweiz, on the south; and the Rheintal, or Rhine valley, on the east. Its greatest length is about 30 miles, and its breadth about 20. It yields good pasturage, and consequently is not destitute of cattle, milk, butter, or cheese. Considerable quantities also of wheat, rye, barley, oats, beans, peas, flax, and wine, are produced in it; besides a great deal of fruit, wood, and turf; with mineral waters, and warm baths. There are many mountains in the canton, the highest of which is that called the *Hohesantli*, or the *Hohes-Mesmer*, which commands a prospect of a prodigious extent. There are also several lakes and rivers. The inhabitants, who are partly Protestants, and partly Roman-catholics, subsist chiefly by their manufactures of linen, crape, fustian, and thread, or by bleaching, and the sale of their cattle, butter, cheese, horses, wood, and coal. Of the twenty-three parishes in the canton, four are Popish and nineteen Protestant. Before the Reformation, the inhabitants were subject to the abbot of St Gall; but they then shook off his yoke, and united themselves

Απερία
||
Αφακα.

with the other cantons; after that, however, there were violent animosities between the Papists and Protestants; the former continually persecuting the latter, till at last, in 1587, by the mediation of the other cantons, the two parties came to an accommodation, by which certain districts were assigned to each party, whereas before they lived promiscuously together; and though these two divisions now constitute but one canton, yet each forms a distinct community or free state, sending its particular representatives to the diets of the confederacy, and having its separate councils and officers. In spirituals the Papists are subject to the bishop of Constance, but the Protestants to their own consistory. The militia of the former does not exceed three thousand, whereas those of the latter amount to ten thousand.

APEPSIA, (from *α*, neg. and *σιωω*, to digest.) Indigestion.

Abstemiousness and excess are alike causes of indigestion. An over distension of the stomach may in some measure injure its proper tone; and long fasting, by inducing a bad quality in the juices secreted into the stomach, renders it feeble, and generates wind. Hard drinking, and any of the causes of an anorexia, also injure digestion.

The columbo root is particularly useful when the stomach is languid, the appetite defective, digestion with difficulty carried on, or when a nausea with flatulence attends. It may be given in substance with any grateful aromatic, or infused in Madeira wine, now and then interposing gentle doses of the tincture of rhubarb.

A mixture of mustard-seed with the columbo root is of admirable utility in complaints of this kind; particularly where acidity and flatulence prevail much in the primæ viæ.

APER, in zoology, a synonyme of the *fus serosa* *. * See *Sus*.

APERIENTS, in the materia medica, an appellation given to such medicines as facilitate the circulation of the humours by removing obstructions.—The five aperient roots of the shops are smallage, fennel, asparagus, parsley, and butcher's broom.

APERTURE, the opening of any thing, or a hole or cleft in any continuous subject.

APERTURE, in geometry, the space between two right lines which meet in a point and form an angle.

APERTURE, in optics, a round hole in a turned bit of wood or plate of tin, placed within the side of a telescope or microscope, near to the object-glass, by means of which more rays are admitted, and a more distinct appearance of the object is obtained.

APERTURES, or *Apertions*, in architecture, are used to signify doors, windows, chimneys, &c.

APETALOSE, or APETALOUS, among botanists, an appellation given to such plants as have no flower-leaves.

APEX, in antiquity, the crest of a helmet, but more especially a kind of cap worn by the flamens.

APEX, among grammarians, denotes the mark of a long syllable, falsely called a *long accent*.

APHACA, the name of a place in Syria, situated between the Heliopolis and Byblus, near Lebanon, (Zosimus); infamous for a temple of Venus, called *Aphacitis*, near which was a lake, round which fire usually burst forth, and its waters were so heavy, that bodies

Aphæresis bodies floated on them. The temple was destroyed by Constantine, as being a school of incontinence, (Eusebius). The name is of Syriac origin, signifying *embraces*.

APHÆRESIS, in grammar, a figure by which a letter or syllable is cut off from the beginning of a word.

APHÆRESIS, that part of surgery which teaches to take away superfluities.

APHANES, a genus of the monogynia order, belonging to the tetrandria class of plants, of which there is only one species known. It is extremely common in corn-fields. The stalks rise five or six together; they are three inches long, round, hairy, and procumbent the leaves stand very thick upon them, and are roundish, but divided, as it were, into three parts, and those deeply serrated at their edges. The flowers come out in a double series, arranged all along the branches, and are of a greenish white, and the whole plant is of a greyish, or whitish-green colour.

APHELIUM, or **APHELION**, in astronomy, is that point in any planet's orbit, in which it is furthest distant from the sun, being that end of the greater axis of the elliptical orbit of the planet most remote from the focus where the sun is.

APHIOM KARAHISSART, a town of Natolia, in Asiatic Turkey; it is called *Aphium* because it produces a great deal of opium, called *aphium* by the Turks. E. Long. 32. 18. N. Lat. 38. 35.

APHIS, in zoology, the **PUCERON**, **VINE-FRETTER**, or **PLANT-LOUSE**; a genus of insects belonging to the order of insecta hemiptera. The rostrum or beak of the aphid is inflected; the antennæ or feelers are longer than the thorax; the wings are four, and erect, or they are wanting; the feet are of the ambulatory kind; and the belly often ends in two horns, from which is ejected that most delicate juice called *Honey-dew* *.

* See *Honey-dew*.

Linnaeus enumerates 33 species of the *Aphis*, all of them inhabitants of particular plants, from which their trivial names are taken; as, *aphis ribis*, *ulmi*, *rosæ*, &c. And he adds, that these seem to be a greater variety of plants producing aphides, than there are different sorts of this insect. But some late observers have been able to distinguish more than double the above number of species; and it is probable that many more remain still to be added, as many of the same kind of plants are found to support two or three quite different sorts of aphides. Thus the plum-tree has two sorts very distinct from each other: one of a yellowish green, with a round short body; the other of a bluish green, as it were enamelled with white, and the shape more oblong. On the gooseberry-bush and currant the same aphides may be found; but each of these is inhabited by two very different species: one being of a dusky green, with a short plump body; the other of a paler green, the body more taper, and transversely wrinkled. The rose-tree, again, supports not less than three distinct species: the largest is of a deep green, having long legs of a brownish cast, with the joints of a very dark brown, as are also the horns and antennæ; a second sort is of a paler green, has much shorter legs, and a more flat body; the third sort is of a pale red, its body transversely wrinkled, and is most frequently on the sweet-briar.

The extraordinary nature of these insects have for some time past justly excited the wonder and atten-

tion of naturalists. They were long ranked among the animals which had been classed with the true androgynes spoken of Mr Breynius; for having never been caught copulating, it was hastily concluded that they multiplied without copulation. This, however, was but a doubt, or at best a mere surmise: but this surmise was believed and adopted by Mr Reaumur; and tho' he supported it by some observations peculiar to himself, the question remained still undecided, till Mr Bonnet seemed to have cleared it up in the affirmative, by taking and shutting up a young aphid, at the instant of its birth, in the most perfect solitude, which yet brought forth in his sight ninety-five young ones. The same experiment being made on one of the individuals of this family, that had been tried with its chief, the new hermit soon multiplied like its parent; and one of this third generation, in like manner brought up in solitude, proved no less fruitful than the former. Repeated experiments, in this respect, as far as the fifth or sixth generation, all uniformly presenting the observer with *second virgins*, were communicated to the Royal Academy of Sciences; when an unforeseen and very strange suspicion, imparted by Mr Trembley to Mr Bonnet, engaged him anew in a series of still more painful experiments than the foregoing. In a letter which that celebrated observer wrote to him from the Hague, the 27th January 1741, he thus expresses himself: "I formed, since the month of November, the design of rearing several generations of solitary pucerons, in order to see if they would all equally bring forth young. In cases so remote from usual circumstances, it is allowed to try all sorts of means; and I argued with myself, Who knows, but that one copulation might serve for several generations? This *"aucto know"*, to be sure, was next to avouching nothing; but, as it came from Mr Trembley, it was sufficient to persuade Mr Bonnet that he had not gone far enough in his investigation. If the fecundity of aphides was owing to the secret copulation suggested by Mr Trembley, this copulation served at least five or more successive generations. Mr Bonnet therefore reared to the amount of the tenth generation of solitary aphides, and had the patience to keep an account of the days and hours of the births of each generation. In short, it was discovered, That they are really distinguished by sexes: that there are males and females amongst them, whose amours are the least equivocal of any in the world: that the males are produced only in the tenth generation, and are but few in number: that these, soon arriving at their full growth, copulate with the females: that the virtue of this copulation serves for ten generations: that all these generations, except the first (from the fecundated eggs), are produced viviparous; and all the individuals are females, except those of the last generation, among whom, as we have already observed, some males make their appearance, to lay the foundations of a fresh series.—These circumstances have been confirmed by other naturalists. In particular, we have a curious and accurate detail of them by Dr Richardson of Rippon, in the Philosophical Transactions, Vol. xi. art. 22. an extract of which we shall here insert, in order to give the reader as full an insight into the nature of these singular insects, as can be done by a mere detail of facts in themselves utterly unaccountable.

"The great variety of species which occur in the insects now under consideration, may make an inquiry into their particular natures seem not a little perplexed; having them, however, skillfully reduced under their proper genus, the difficulty is by this means considerably diminished. All the insects comprehended under any distinct genus, we may reasonably suppose to partake of one general nature; and, by diligently examining any of the particular species, may thence gain some insight into the nature of all the rest. With this view I have chosen, out of the various sort of aphides, the largest of those found on the rose-tree; not only as its size makes it the more conspicuous, but as there are few others of so long a duration. This sort, appearing early in the spring, continues late in the autumn; while several are limited to a much shorter term, in conformity to the different trees and plants from whence they drew their nourishment.

1. "If at the beginning of February the weather happens to be so warm, as to make the buds of the rose-tree swell and appear green; small aphides are frequently to be found upon them, not larger than the young ones in summer when first produced. But there being no old ones to be found at this time of the year, which in summer I had observed to be viviparous, I was formerly not a little perplexed by such appearances, and almost induced to give credit to the old doctrine of equivocal generation. That the same kind of animal should at one time of the year be viviparous, and at another time oviparous, was an opinion I could then by no means entertain. This, however, frequent observation has at last convinced me to be fact; having found those aphides which appear early in the spring, to proceed from small black oval eggs which were deposited on the last years shoots in autumn: though, when it happens that the insects make too early an appearance, I have observed the greatest part to suffer from the sharp weather that usually succeeds, by which means the rose-trees are some years in a manner freed from them.

"Those which withstand the severity of the weather seldom come to their full growth before the month of April; at which time they usually begin to breed, after twice casting off their exuviz or outward covering. It appears then that they are all females, which produce each of them a very numerous progeny, and that without having intercourse with any male insect. As I observed before, they are viviparous; and what is equally uncommon, the young ones all come into the world backwards. When they first come from the parent, they are enveloped by a thin membrane, having in this situation the appearance of an oval egg; which, I apprehend, must have induced Reaumur to suspect that the eggs discovered by Bonnet were nothing more than mere abortions. These egg-like appearances adhere by one extremity to the mother; while the young ones contained in them extend the other; by that means gradually drawing the ruptured membrane over the head and body, to the hind feet. During this operation, and for some time after, by means of something glutinous, the fore part of the head adheres to the vent of the parent. Being thus suspended in the air, it soon frees itself from the membrane in which it was confined, and, after its limbs are a little strengthened, is set down on some tender shoot, and then left to

provide for itself.

2. "In the spring-months, there appear on the rose-trees but two generations of aphides, including those which immediately proceed from the last years eggs; the warmth of the summer adds so much to their fertility, that no less than five generations succeed one another in the interval. One is produced in May, which casts off its covering; while the months of June and July each supply two more, which cast off their coverings three or four times, according to the different warmth of the season. This frequent change of the outward covering is the more extraordinary, as it is the oftener repeated when the insects come the soonest to their growth; which I have sometimes observed to happen in ten days, where warmth and plenty of nourishment have mutually conspired. From which considerations I am thoroughly convinced that these various coverings are not connate with the insect; but that they are, like the scarf-skin, successively produced.

"Early in the month of June, some of the third generation which were produced about the middle of May, after casting off their last covering, discover four erect wings, much longer than their bodies: and the same is observable in all the succeeding generations, which are produced during the summer-months; without, however, distinguishing any diversity of sex, as is usual in several other kinds of insects. For some time before the aphides come to their full growth, it is easy to discover which of them will have wings, by a remarkable fullness of the breast, which, in the others, is hardly to be distinguished from the body. When the last covering is rejected, the wings, which were before folded up in a very narrow compass, gradually extend themselves in a most surprising manner, till their dimensions are at last very considerable. But these winged ones have the peculiarity, that the number of them does not seem so much to depend on their original structure, as on the quantity or quality of the nourishment with which they are supplied: it being frequently observed, that those on a succulent shoot have few or none with wings among them, while others of the same generation, on a less tender branch, are most of them winged; as if only the first rudiments of wings were composed in the former, while nature thought proper to expand them in the latter, that they might be more at liberty to supply their wants.

"The increase of these insects in the summer-time is so very great, that, by wounding and exhausting the tender shoots, they would frequently suppress all vegetation, had they not many enemies which restrain them. To enumerate the variety of other insects that in their worm and fly state are constantly destroying them, would exceed the bounds of the present design: there is one, however, so singular in the manner of executing its purpose, that I cannot pass by it without some further notice: This is a very small, black, ichneumon fly, with a slender body and very long antennae, which darts its pointed tail into the bodies of the aphides, at the same time depositing an egg in each. This egg produces a worm, which feeds upon the containing insect till it attains its full growth; when it is usually changed to that kind of fly from whence it came. In this, however, it is sometimes prevented by another sort of small black fly, which wounds this worm through its pearl-like habitation; and by laying one of

Aphis.

of its eggs therein, instead of the former fly, produces its own likeness. I must, however, further observe, notwithstanding these insects have many enemies, they are not without friends; if we may consider those as such who are very officious in their attendance, for the good things they expect to reap thereby. The ant and the bee are both of this kind, collecting the honey in which the aphides abound; but with this difference, that the ants are constant visitors, the bee only when flowers are scarce. To which let me also add, that the ants will suck in the delicious nectar while the aphides are in the act of discharging it from the anus; but the bees only collect it from the leaves on which this honey-dew has fallen.

3. "In the autumn I find three more generations of aphides to be produced; two of which make their appearance in the month of August, and the third usually appear before the middle of September. As the two first differ in no respect from those which we meet with in summer, it would be waiting time to dwell any longer upon them; but the third, differing greatly from all the rest, demands our giving it a more serious attention. Though all the aphides which have hitherto appeared were females, in this tenth generation are found several male insects; not that they are by any means so numerous as the females, being only produced by a small number of the former generation. To which I must further add, that I have observed those which produce males, previously to have produced a number of females; which in all respects resembling those already described, I shall decline taking into any further consideration.

"The females have at first altogether the same appearance with those of the former generations; but in a few days their colour changes from a green to a yellow, which is gradually converted into an orange colour before they come to their full growth. They differ likewise in another respect, at least from those which occur in the summer, that all those yellow females are without wings. The male insects are however still more remarkable, their outward appearance readily distinguishing them from the females of this and of all other generations. When first produced, they are not of a green colour like the rest, but of a reddish brown; and have afterwards, when they begin to thicken about the breast, a dark line along the middle of the back. These male insects come to their full growth in about three weeks time, and then cast off their last covering; the whole insect being, after this operation, of a bright yellow colour, the wings only excepted. But after this they soon change to a darker yellow, and in a few hours to a very dark brown; if we except the body, which is something lighter coloured, and has a reddish cast. They are all of the winged sort; and the wings, which are white at first, soon become transparent, and at length appear like very fine black gauze.

"The males no sooner come to maturity than they copulate with the females; in which act they are readily discovered, as they remain in conjunction for a considerable time, and are not easily disturbed. The commerce between them continues the whole month of October, and may be observed at all times of the day, though I have found it most frequent about noon; especially when the weather is moderately warm, and

the sun overcast. The females, in a day or two after their intercourse with the males, I have observed to lay their eggs; which they usually do near the buds, when they are left to their own choice. Where there are a number crowded together, they of course interfere with each other; in which case they will frequently deposit their eggs on other parts of the branches, or even on the spines with which they are beset."

APHLASTUM, in the ancient navigation, a wooden ornament, shaped like a plume of feathers, fastened on the goose's or swan's neck used by the ancient Greeks in the heads of their ships. The Aphlastum had much the same office and effect in a ship, that the crest had on the helmet. It seems also to have had this further use, viz. by the waving of a party-coloured ribband fastened to it, to indicate from what quarter the wind blew.

APHONIA, among physicians, signifies a suppression or total loss of voice. It is never a primary disease, but a consequence of many different disorders. The cure is to be effected by removing the disorder from whence the Aphonia proceeds.

APHORISM, a maxim, or principle, of a science; or a sentence which comprehends a great deal in a few words.

APHRACTI, in the ancient military art, denotes open vessels, without decks or hatches, furnished only at head and stern with cross planks, whereon the men stood to fight.

APHRODISIA, in antiquity, festivals kept in honour of Venus, the most remarkable of which was that celebrated by the Cyprians. At this solemnity several mysterious rites were practised: all who were initiated to them offered a piece of money to Venus as an harlot, and received as a token of the goddess's favour a measure of salt, and a *σάλας*: the former, because salt is a concretion of sea-water, to which Venus was thought to owe her birth; the latter, because she was the goddess of wantonness.

APHRODISIACS, among physicians, medicines which increase the quantity of feed, and create an inclination to venery.

APHRODISIAS, an island on the coast of Carmania, (Pliny;) sacred to Venus, (Arrian). Another island on the coast of Cyrene, with a road for ships, (Scylax;) called *Laeta*, or the island of Venus, (Ptolemy.)

APHRODISIUS, an inland city of Caria, called the *Metropolis*, (Ptolemy, Stephanus); said by Suidas to have been called *Ninos*. Another of Cilicia, (Ptolemy); so called from the worship and a temple of Venus, (Pliny). A third of Thrace, to the north of the isthmus of the Chersonesus; an open town, till it was fortified by Justinian, (Procopius).

APHRODITA, in zoology, an insect of the order of vermes mollusca. The body of the aphrodita is oval, with many small tentacula or protuberances on each side, which serve as so many feet: The mouth is cylindrical, at one end of the body, and capable of being retracted, with two bristly tentacula. There are four species of this insect, viz. 1. The aculeata, with 32 tentacula, or feet, an inhabitant of the European seas, and often found in the belly of the codfish. See Plate XXIII. fig. 4. This figure is taken from the life. It was found on the shore of the frith

Aphlastum

||
Aphrodita.

Aphronitre

Apis.

of Forth, about a mile east from Leith, by Dr Lettison, and by him communicated to the proprietors of this work. Johnston, Seba, and other authors, have given figures of the aphrodita; but they are not so accurate as could be wished. 2. The scabra, of an oblong shape, scabrous on the back, with about 20 tentacula. 3. The squamata, with 24 feet, and scaly on the back. 4. The imbricata, is very like the former, only its scales are more glabrous.

APHRONITRE, in natural history, a name given by the ancients to a particular kind of natrum.

APHTHÆ, in medicine, small, round, and superficial ulcers arising in the mouth. The principle feat of this disease, is the extremity of the excretory vessels, salival glands, and, in short, all glands that furnish a humour like the saliva, as the lips, gums, &c. See the *Index* subjoined to MEDICINE.

APHYLLANTHES, OF BLUE MONTPELIER PINK, a genus of the monogynia order, belonging to the hexandria class of plants; of which there is only one species known. It is a native of France; the root consists of a number of slender, hard, woody, long, and contorted fibres: the radical leaves are very numerous, two inches long, extremely narrow, and wither very quickly. The stalk is round, smooth, without a joint or knot, naked, and tolerably firm; at its top stands a single and very beautiful blue flower, arising from a kind of compound imbricated cup.

APHYTIS, a town of the Cherfonefus, called *Palare*, in Macedonia; (Pliny); famous for an oracle of Apollo.

APIARIS, a place where bees are kept. See APIS.

APIASTER, in ornithology, the trivial name of a species of the merops. See MEROPS.

APICES, in botany, the same with antheræ *.

APICIUS. There were at Rome three of that name, famous for their gluttony: the second is the most celebrated of the three. He lived under Tiberius, spent immense sums on his belly, and invented divers sorts of cakes which bore his name. He kept as it were a school of gluttony at Rome. After having spent two millions and a half in entertainments, finding himself very much in debt, he examined into the state of his affairs; and seeing that he had but 250,000 li- vers remaining, he poisoned himself, out of apprehension of starving with such a sum. He had prostituted himself when very young to Sëjanus.

APINA, or *Apine*, a town of Apulia, built by Diomedes, as was also Trice, (Pliny).. *Apine* and *Trice* is a proverbial saying for things trifling and of no value, (Martial); and *Apinari* was the appellation for triflers or buffoons, (Trebellius Pollio.)

APION, a famous grammarian, born in Egypt, was a professor at Rome in the reign of Tiberius. He had all the arrogance of a mere pedant, and amused himself with difficult and insignificant inquiries. One of his principal works was his *Antiquities of Egypt*.

APIS, in Pagan mythology, one of the Egyptian gods, worshipped in the form of a living bull. Mythologists say, that Apis was a king of the Argives, who, leaving his dominions to his brother, went into Egypt, where he was known under the name of *Osiris*; that he married Isis; and having civilized the Egyptians, and taught them the manner of planting the

vine, they revered him after his death as a god, under the figure of a bull. See the article EGYPT.

APIS, or BEE, in zoology, a genus of insects belonging to the order of insecta hymenoptera. The mouth is furnished with two jaws, and a proboscis infolded in a double sheath; the wings are four in number, the two foremost covering those behind when at rest: In the anus or tail of the females, and working bees, which are of no sex, there is a hidden sting. Linnaeus enumerates not less than 55 species of the apis, viz.

1. The mellifica, or honey-bee, is furnished with downy hairs, has a dusky-coloured breast, and brownish belly; the tibiae of the hind-legs are ciliated, and transversely streaked on the inside. Each foot of this bee terminates in two hooks, with their points opposite to each other; in the middle of these hooks there is a little thin appendix, which, when unfolded, enables the bees to fasten themselves to glass or the most polished bodies. This part they likewise employ for transmitting the small particles of crude wax which they find upon flowers to the cavity in their thigh, hereafter described. The queen and drones, who never collect wax in this manner, have no such cavity. The bee is also furnished with a proboscis or trunk, which serves to extract the honey from flowers; and have, besides, a real mouth situated in the forepart of the head, with which they are able to feed on the farina of flowers, from which afterwards is made wax. The belly of the bee is divided into six rings or joints; which sometimes shorten the body, by slipping the one over the other. In the inside of the belly there is a small bladder or reservoir, in which the honey is collected, after having passed thro' the proboscis and a narrow pipe which runs through the head and breast. This bladder, when full of honey, is about the size of a small pea.

The sting, which is situated at the extremity of the belly, is a very curious weapon; and, when examined by the microscope, appears of a surprising structure. It has a horny sheath or scabbard, which includes two bearded darts. This sheath ends in a sharp point, near the extremity of which a slit opens, through which, at the time of stinging, the two bearded darts are protruded beyond the end of the sheath: one of these is a little longer than the other, and fixes its beard first; and the other instantly following, they penetrate alternately deeper and deeper, taking hold of the flesh with their beards or hooks, till the whole sting is buried in the flesh; and then a venomous juice is injected through the same sheath, from a little bag at the root of the sting, which occasions an acute pain and swelling of the part, which sometimes continues several days. But this is best prevented by enlarging the wound directly, to give it some discharge. This poison seems to owe its mischievous efficacy to certain pungent salts. Let a bee be provoked to strike its sting against a plate of glass, and there will be a drop of the poison discharged and left upon the glass. This being placed under a double microscope, as the liquor evaporates, the salts will be seen to congregate, forming oblong, pointed, clear crystals.—Mr Derham counted on the sting of a wasp eight beards on the side of each dart, somewhat like the beards of fish-hooks; and the same number are to be counted on the darts of the bee's sting. When these beards are struck deep in the flesh,

Apis,
or Bee.Description
of the ho-
ney-bee.

Its Sting.

* See An-
thera.

Apis,
or Bee.

if the wounded person starts, or discomposes the bee before it can disengage them, the sting is left behind sticking in the wound; but if he have patience to stand quiet, the creature brings the hooks down close to the sides of the darts, and withdraws the weapon; in which case, the wound is always much less painful. The danger of being stung by bees may be in a great measure prevented by a quiet composed behaviour. A thousand bees will fly and buzz about a person without hurting him, if he stand perfectly still, and forbear disturbing them even when near his face; in which case, he may observe them for hours together without danger: but if he molests or beats them away, he usually suffers for it. It has been lately affirmed*, that a person is in perfect safety in the midst of myriads of bees, if he but carefully keep his mouth shut, and breathe gently through the nostrils only; the human breath, it would seem, being peculiarly offensive to their delicate organs; and merely with this precaution, it is said, the very hives may be turned up, and even part of the comb cut out, while the bees are at work.

As the honey-bees are both useful insects, and endowed with peculiar instincts, we shall give a particular account of their generation and economy, and of the most approved methods of managing them.

I. OECONOMY, INSTINCTS, &c. of the HONEY-BEE.

We may consider a hive of bees as a well peopled city, in which are commonly found from 15,000 to 18,000 inhabitants. This city is in itself a monarchy;—composed of a *queen*; of males, which are the *drones*; and of *working bees*, which are not of either sex. The combs, which are of pure wax, serve as their magazine of stores, and for the nursing places of their young offspring. There is between the combs a space sufficient for two bees to march abreast, without embarrassing each other; and in some parts it is more spacious. There are also holes, or narrow passages, which cross the combs transversely, and are intended to shorten the way when the bees pass from one comb to another.

³ *Queen-bee.* The queen is easily distinguished from the other bees, by the form of her body: she is longer and larger than they are, and her wings are much shorter than theirs in proportion to her body; for the wings of the other bees cover their whole body, whereas those of the queen hardly reach beyond her middle, or end at about the third ring of her belly. Her hinder parts are more taper than those of the other bees, terminating sharper. Her belly and legs are of a deep yellow, much resembling the purest gold. The queen, like the working bees, has a sting; contrary to the opinion of many writers, who may have taken this for granted, because she is extremely pacific. One may handle her, turn her, and even tease her for some time, before she determines herself to vengeance. Her sting differs not from that of the working bee, excepting that it is bigger, and a little curved.

⁴ *Attachment of her subjects.* A hive of bees cannot subsist without a queen, as she alone produces their numerous posterity; and on this account their fidelity and attachment to their sovereign is admirable.

⁵ *Mr Wildman's feats by means of the queen.* Mr Wildman, by his dexterity in the management of bees, has lately surprised the whole kingdom. He can order a swarm to light where he pleases, almost instantaneously; he can order them to settle on his head,

then remove them to his hand; command them to depart and settle on a window, table, &c. at pleasure. We shall subjoin his method of performing these feats, in his own words: "Spectators," says he, "wonder much at my attaching bees to different parts of my body, and wish much to be possessed of the secret means by which I do it. I have unwarily promised to reveal it; and am therefore under a necessity of performing that promise: but while I declare, that their fear and the queen are the chief in these operations, I must warn my readers that there is an art necessary to perform it, namely practice, which I cannot convey to them, and which they cannot speedily attain; yet till this art is attained, the destruction of many hives of bees must be the consequence; as every one will find on their first attempt to perform it.

"Long experience has taught me, that as soon as I turn up a hive, and give it some taps on the sides and bottom, the queen immediately appears, to know the cause of this alarm; but soon retires again among her people. Being accustomed to see her so often, I readily perceive her at first glance; and long practice has enabled me to seize her instantly, with a tenderness that does not in the least endanger her person. This is of the utmost importance; for the least injury done to her brings immediate destruction to the hive, if you have not a spare queen to put in her place, as I have too often experienced in my first attempts. When possessed of her, I can, without injury to her, or exciting that degree of resentment that may tempt her to sting me, slip her into my other hand, and returning the hive to its place, hold her there, till the bees missing her, are all on wing, and in the utmost confusion. When the bees are thus distressed, I place the queen where-ever I would have the bees to settle. The moment a few of them discover her, they give notice to those near them, and those to the rest; the knowledge of which soon becomes so general, that in a few minutes they all collect themselves round her; and are so happy in having recovered this sole support of their state, that they will long remain quiet in their situation. Nay, the scent of her body is so attractive of them, that the slightest touch of her, along any place or substance, will attract the bees to it, and induce them to pursue any path she takes.

"My attachment to the queen, and my tender regard for her precious life, makes me most ardently wish that I might here close the detail of this operation, which, I am afraid, when attempted by unskilful hands, will cost many of their lives; but my love of truth forces me to declare, that, by practice, I am arrived at so much dexterity in the management of her, that I can, without hurt to her, tie a thread of silk round her body, and thus confine her to any part in which she might not naturally wish to remain; or I sometimes use the less dangerous way of clipping her wings on one side.

"I shall conclude this account in the manner of C. Furius Cretinus, who being cited before the Curule Edile and an assembly of the people, to answer to a charge of forcery, founded on his reaping much larger crops from his small spot of ground, than his neighbours did from their extensive fields, produced his strong implements of husbandry, his well-fed oxen, and a hale young woman his daughter; and, pointing to them, said, These,

Apis,
or Bee.

Apis,
or Bee.

These, Romans, are my instruments of witchcraft; but I cannot shew you my toil, my sweats, and anxious cares. So may I say, These, Britons, are my instruments of witchcraft; but I cannot shew you my hours of attention to this subject, my anxiety and care for these useful insects; nor can I communicate to you my experience, acquired during a course of years."

6
Consequences of her
death.

When a queen dies by any accident, the bees of her hive immediately cease working, consume their own honey, fly about their own and other hives at unusual hours, when other bees are at rest, and die rather than be without her, on whom alone depends the supply of future labourers. Her loss is proclaimed by a clear and interrupted humming. This sign should be a warning to the owner of the bees, to take what honey remains in the hive, or to procure them another queen.

The dissection of the queen-bee shews evidently that she lays many thousand eggs; and observations as well as anatomy evince, that these eggs are impregnated by the drones or males, in the same manner as other insects couple. It is computed that the ovaria of a queen-bee contain more than 5000 eggs at one time; and therefore it is not difficult to conceive that a queen-bee may produce 10,000 or 12,000 bees, or even more, in the space of two months.

7
Of the
drones.

Drones are smaller than the queen, and larger than the working bees; and in flying they make a greater noise. If a hive is opened in the beginning of spring, not a single drone will be found in it; from the middle of May to the end of June, hundreds of them will be found, commonly from 200 or 300 to 1000; and from thence to the following spring, it would be in vain to seek for them. They go not out till 11 in the morning, and return before six in the evening. To live, seems to be their only business; yet their dissection informs us that they have the male parts of generation, and observations have assured us that they couple with the queen. While their presence is thus necessary for the queen, or whilst, in the opinion of many, their warmth is necessary to cherish the young, they are suffered to enjoy the sweets of love and life; but as soon as they become useless in the hive, the working bees declare the most cruel war against them, and make terrible slaughter of them. The stings of the working bees give them an advantage, which more than counterbalance the size of the drones, who have not any sting; besides, we frequently see several working bees set on one drone. This war affects not only the bees already in life, but even the eggs and maggots; for the law which has pronounced the destruction of the males has no exception, it extends equally to those which do not yet breathe and to those which do; the hive is cleared of every egg, maggot, or nymph; the whole is torn away and carried off. After the season proper for increasing the number of bees is past, and when they should attend only to the supplying of their magazines sufficiently with winter-stores, every vestige of the drones is destroyed, to make room for honey. Whenever drones are observed to remain in a hive late in the autumn, it is held to be a bad sign of the state of the hive.

8
The work-
ing bees.

The working bees compose the greatest body of the state. Columella informs us, that the ancients distinguished several kinds of them. He joins in opinion with Virgil, who approves of those which are

small, oblong, smooth, bright, and shining, of a gentle and mild disposition: "for," continues he, "by how much the larger and rounder the bee is, by so much the worse it is; but if it be fierce and cruel, it is the worst of all. The angry disposition of bees of a better character is easily softened by the frequent intercourse of those who take care of them, for they grow more tame when they are often handled." The experience of ages has now established the sort of bees which have been found to answer best the purposes of keeping them.

The working bees have the care of the hive, collect the wax and honey, fabricate and work up the wax, build the cells, feed the young, keep the hive clean, drive from thence strangers, and employ themselves in all other concerns relating to the hive.

The working bee has two stomachs; one which contains the honey, and a second in which is contained the crude wax. The working bees have no parts analogous to the ovaria of the queen, or that resemble the male organs of the drones.

The sting is very necessary for a working bee, both as an offensive and as a defensive weapon: for their honey and wax excite the envy of many greedy and lazy insects; and they have also to defend themselves against enemies, who are fonder of eating them than their honey. There is likewise a time when the drones must be sacrificed and exterminated for the good of the society; and as they are larger and stronger than the working bees, these last would have a very unequal match, were it not for this poisonous sting.

There happen also among bees, either of the same Of their bat-
or of different hives, most deadly feuds, in which their ties.
stings are their chief weapons. In these contests, great skill may be discerned in their manner of pointing the sting between the scaly rings which cover their bodies, or to some other easily vulnerable part. The bee which first gains the advantage remains the conqueror: tho' the victory costs the victor his life, if he has left his sting in the body of the enemy; for, with the sting, so much of his body is torn out, that death inevitably follows. Bees have very severe conflicts when whole hives engage in a pitched battle, and many are slain on both sides. Their fighting and plundering one another ought chiefly to be imputed, as Mr Thorley observes, either to their perfect abhorrence of sloth and idleness, or to their insatiable thirst for honey; for when, in spring or autumn, the weather is fair, but no honey can be collected from plants, and is to be found only in the hives of other bees, they will venture their lives to get it there.

Dr Warder assigns another cause of their fighting, which is, the necessity that the bees are reduced to when their own hive has been plundered, at a season when it is too late for them to repair the loss by any industry in the fields.

Sometimes one of the queens is killed in battle. In this case, the bees of both hives unite as soon as her death is generally known among them. All then become one people; the vanquished go off with the robbers, richly laden with their own spoils, and return every day with their new associates to pillage their old habitation. This causes a throng, unusual for the season, at the door of the hive they are plundering; and if the owner lifts it up at night, when all are gone

S f f 2 home,

Apis,
or Bee.

Apis,
or Bee.Apis,
or Bee.

home, he will find it empty of inhabitants; though there perhaps will remain in it some honey, which he takes as his property.

When two swarms take flight at the same time, they sometimes quarrel, and great numbers are destroyed on both sides, till one of the queens is slain. This ends the contest, and the bees of both sides unite under the surviving sovereign.

10
Their labours.

When the bees begin to work in their hives, they divide themselves into four companies: one of which roves in the fields in search of materials; another employs itself in laying out the bottom and partitions of their cells; a third is employed in making the inside smooth from the corners and angles; and the fourth company bring food for the rest, or relieve those who return with their respective burdens. But they are not kept constant to one employment; they often change the tasks assigned them: those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs, by which they understand each other: for when any of them want food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is so great, that, in a day's time, they are able to make cells which lie upon each other numerous enough to contain 3000 bees.

11
Of the combs.

In the plan and formation of these cells, they discover a most wonderful sagacity. In constructing habitations within a limited compass, an architect would have three objects in view: first, to use the smallest quantity that can be of materials; next, to give to the edifice the greatest capacity on a determined space; and thirdly, to employ the spot in such a manner that none of it may be lost. On examination, it will be found that the bees have obtained all these advantages in the hexagonal form of their cells: for, first, there is an economy of wax, as the circumference of one cell makes part of the circumferences of those contiguous to it; secondly, the economy of the spot, as these cells which join to one another leave no void between them; and thirdly, the greatest capacity or space; as, of all the figures which can be contiguous, that with six sides gives the largest area. This thriftiness prompts them to make the partitions of their cells thin; yet they are constructed so as that the solidity may compensate for the scantiness of materials. The parts most liable to injury are the entrance of the cells. These the bees take care to strengthen, by adding quite round the circumference of the apertures a fillet of wax, by which means this mouth is three or four times thicker than the sides; and they are strengthened at the bottom by the angle formed by the bottom of three cells falling in the middle of an opposite cell. The combs lie parallel to each other; and there is left between every one of them, a space which serves as a street, broad enough for two bees to pass by each other. There are holes which go quite through the combs, and serve as lanes for the bees to pass from one comb to another, without being obliged to go a great way about. When they begin their combs, they form at the top of the hive a root or stay to the whole edifice, which is to hang from it. Though they generally lay the found-

ations of the combs so that there shall be no more between them than what is sufficient for two bees to pass, yet they sometimes place those beginnings of two combs too far asunder; and, in this case, in order to fill up part of the void space arising from that bad disposition, they carry their combs on obliquely, to make them gradually approach each other. This void space is sometimes so considerable, that the bees build in it an intermediate comb, which they terminate as soon as the original combs have only their due distances. As the combs would be apt, when full, to overcome by their weight all the security which the bees can give them against falling; they who prepare hives, set in them, crosswise, sticks, which serve as props to the combs, and save the bees a great deal of labour. It is not easy to discover the particular manner of their working; for, notwithstanding the many contrivances used for this purpose, there are such numbers in continual motion, and succeed one another with such rapidity, that nothing but confusion appears to the sight. Some of them, however, have been observed carrying pieces of wax in their talons, and running to the places where they are at work upon the combs. These they fasten to the work by means of the same talons. Each bee is employed but a very short time in this way: but there is so great a number of them that go on in a constant succession, that the comb increases very perceptibly. Besides these, there are others that run about beating the work with their wings and the hinder part of their body, probably with a view to make it more firm and solid.

Whilst part of the bees are occupied in forming the cells, others are employed in perfecting and polishing those that are new modelled. This operation is performed by their talons, taking off every thing that is rough and uneven. These polishers are not so defutery in their operations as those that make the cells; they work long and diligently, never intermitting their labour, excepting to carry out of the cell the particles of wax which they take off in polishing. These particles are not allowed to be lost; others are ready to receive them from the polishers, and to employ them in some other part of the work.

The balls which we see attached to the legs of bees returning to the hives are not wax, but a powder collected from the stamina of flowers, and yet brought to the state of wax. The substance of these balls, heated in any vessel, does not melt as wax would do, but becomes dry, and hardens: it may even be reduced to a coal. If thrown into water, it will sink; whereas wax swims. To reduce this crude substance into wax, it must first be digested in the body of the bee.

Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and soon becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads into two little balls. In the thighs of the hind-legs there are two cavities, edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flies from flower to flower, increasing its store, and adding to its stock of wax; until the ball, upon each thigh, becomes as big as a grain

12
Of their building materials, and provisions.
1. Wax.

of pepper : by this time, having got a sufficient load, it returns, making the best of its way to the hive.

After the bees have brought home this crude substance, they eat it by degrees ; or, at other times, three or four bees come and eat the loaded bee, by eating each of them a share, the loaded bee giving them a hint so to do. Hunger is not the motive of their thus eating the balls of waxy matter, especially when a swarm is first hived ; but it is their desire to provide a speedy supply of real wax for making the combs. At other times, when there is no immediate want of wax, the bees lay this matter up in repositories, to keep it in store.

When this waxy matter is swallowed, it is, by the digestive powers of the bee, converted into real wax, which the bees again disgorge as they work it up into combs ; for it is only while thus soft and pliant from the stomach, that they can fabricate it properly. That the wax thus employed is taken from their stomachs, appears from their making a considerable quantity of comb soon after they are hived, and even on any tree or shrub where they have rested but a short while before their being hived, though no balls were visible on their legs, excepting those of a few which may be just returned from the field. This is farther confirmed by what happened in a swarm newly hived : for two days together, from the time of their quitting their former home, it rained constantly ; inasmuch that not one bee was able to stir out during that time : yet at the end of the two days, they had made a comb 15 or 16 inches long, and thick in proportion.

The crude wax, when brought home by the bees, is often of as different colours as are the flowers from which it is collected : but the new combs are always of a white colour, which is afterwards changed only by the impurities arising from the steam, &c. of the bees.

Bees collect crude wax also for food ; for if this was not the case, there would be no want of wax after the combs are made : but they are observed, even in old hives, to return in great numbers loaded with such matter, which is deposited in particular cells, and is known by the name of *bee-bread*. We may guess that they consume a great deal of this substance in food, by the quantity collected, which, by computation, may in some hives amount to an hundred weight in a season, whilst the real wax in such an hive does not perhaps exceed two pounds.

It is well known that the habitation of bees ought to be very close ; and what their hives want, from the negligence or unskillfulness of man, these animals supply by their own industry : so that it is their principal care, when first hived, to stop up all the crannies. For this purpose they make use of a resinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called *propolis* : it will grow considerably hard in the hive ; tho' it will in some measure soften by heat ; and is often found different in consistence, colour, and smell. It has generally an agreeable aromatic odour when it is warmed ; and by some it is considered as a most grateful perfume. When the bees begin to work with it, it is soft ; but it acquires a firmer consistence every day ; till at length it assumes a brown colour, and becomes much harder than wax. The bees carry it on their hinder legs ; and some think it is met with on the birch, the willow, and poplar.

However it is procured, it is certain that they plaster the inside of their hives with this composition.

Honey is originally a juice digested in plants, which sweats through their pores, and chiefly in their flowers, or is contained in reservoirs in which nature stores it. The bees sometimes penetrate into these stores, and at other times find the liquor exuded. This they collect in their stomachs ; so that, when loaded with it, they seem, to an inattentive eye, to come home without any booty at all.

Besides the liquor already mentioned, which is obtained from the flowers of plants, another substance, called *honey-dew* *, has been discovered, of which the bees are equally fond. Of this substance there are two kinds, both deriving their origin from vegetables, tho' in very different ways.

The first kind, the only one known to husbandmen, and which passes for a dew that falls on trees, is no other than a mild sweet juice, which, having circulated through the vessels of vegetables, is separated in proper reservoirs in the flowers, or on the leaves, where it is properly called the *honey-dew* : sometimes it is deposited in the pith, as in the sugar-cane ; and, at other times, in the juice of pulpy summer-fruits, when ripe. Such is the origin of the manna which is collected on the ash and maple of Calabria and Briançon, where it flows in great plenty from the leaves and trunks of these trees, and thickens into the form in which it is usually seen.

The second kind of honey-dew, which is the chief resource of bees after the spring-flowers and dew by transpiration on leaves are past, owes its origin to a small mean insect *, the excrement thrown out by which, makes a part of the most delicate honey we ever taste.

From whatever source the bees have collected their honey, the instant they return home, they seek cells in which they may disgorge and deposit their loads. They have two sorts of stores : one which consists of honey laid up for the winter ; and the other of honey intended for accidental use, in case of bad weather, and for such bees as do not go abroad in search of it. Their method of securing each of these is different. They have in each cell a thicker substance, which is placed over the honey, to prevent its running out of the cell ; and that substance is raised gradually as the cell is filled, till the bees, finding that the cell cannot contain any more, close it with a covering of wax, not to be opened till times of want, or during the winter.

It has been already observed, that the cells are intended for other purposes besides being places of store for honey. One of the chief uses is, their being nurseries for the young. The cells for those which are to be working bees, are commonly half an inch deep ; those for drones, three quarters of an inch ; and those which are intended for keeping of honey only, still deeper. This accounts for the inequalities observed in the surface of combs.

The queen-bee is generally concealed in the most secret part of the hive, and is never visible but when she lays her eggs in such combs as are exposed to sight. When she does appear, she is always attended by ten or a dozen of the common sort, who form a kind of retinue, and follow her wherever she goes with a sedate and grave tread. Before she lays her eggs, she examines the cells where she designs to lay them ; and if she finds that they contain neither honey, wax, nor

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any embryo, she introduces the posterior part of her body into a cell, and fixes to the bottom of it a small white egg, which is composed of a thin white membrane, full of a whitish liquor. In this manner she goes on, till she fills as many cells as she has eggs to lay, which are generally many thousands. After the eggs lie four days in the cells, they appear in the form of small caterpillars; and generally lie twisted round, so that the two extremities touch each other. The bees then supply them with a little honey for food, the quantity of which they increase till the eighth day from the birth of the caterpillar. After this, the bees discover no more care about their young; but stop up the mouths of the cells with wax. The embryos lie in this state twelve days, during which time they undergo surprising changes. They first change their situation in the cells, and instead of being rolled up, they extend themselves along, and place their heads towards the mouth of the cell; after this, the head of the worm begins to have a small extension, which is the rudiment of the proboscis: upon this head there is likewise a black point; and at a little distance from this point, a black streak upon the back: the first lineaments of the feet likewise appear; but they are very small. After the head is formed, and the proboscis lengthened, all the other parts display themselves successively; so that the whole worm or embryo is changed into an aurelia or nymph, which is the fly almost perfect, except that it is yet white and soft, and wants that crust with which it is afterwards covered. By this transformation the worm is stripped of a white thin pellicle, which adheres to the sides of the cell. The young bee being stripped of this pellicle, and all the parts being unfolded by degrees, and changed thro' successive colours from yellow to black, arrives at perfection on the 20th day; when she cuts, with her jaws or talons, the covering of wax upon the mouth of the cells, and issues out. When the young bees first get out of the cell, they appear drowsy, but soon acquire agility and command of their members; for they have been often observed to go to the fields, and return loaded with wax the same day that they issue from the cells. As soon as a young bee quits its cell, one of the old ones takes off the wax-cover, and kneads and employs the wax for some other purpose: Another of them repairs and cleanses the cell, removing the pellicle and other furdies which was left by the young one.

The eggs from which drones are to proceed, are, as already observed, laid in larger cells than those of the working bees. The coverings of these cells, when the drones are in their nymph-state, are convex or swelling outward, whilst the cells of the working bees are flat. This, with the privilege of leading idle effeminate lives, and not working for the public stock, is what distinguishes the drones.

The bees depart from their usual file of building when they are to raise cells for bringing up such maggots as will become queens. These are of a longish oblong form, having one end bigger than the other, with their exterior surface full of little cavities. Wax, which is employed with so geometrical a thriftiness in the raising of hexagonal cells, is expended with profusion in the cell which is to be the cradle of a royal maggot. They sometimes fix it in the middle, and at other times on one side of a comb. Several common

cells are sacrificed to serve as a basis and support to it. It is placed almost perpendicular to the common cells, the largest end being uppermost. The lower end is open till the season for closing it comes, or till the maggot is ready for transformation. It would be difficult to conceive how a tender maggot can remain in a cell turned bottom upmost, if we did not find it buried in a substance scarcely fluid, and if it was not in itself, at first, small and light enough to be suspended in this clammy paste. As it grows, it fills all the upper and larger part of the cell. As soon as the young queen comes out of her cell, that cell is destroyed, and its place is supplied by common cells; but as the foundation of the royal cell is left, this part of the comb is found thicker than any other. There are several such cells prepared: for the queen lays from seven or eight to 20 royal maggots; and if there was only one reared in each hive, the swarms might often want a conductress. Many accidents may also destroy the little maggot, before it becomes a bee. It is therefore necessary that the queen should lay more than one of these royal eggs; and there are several young queens in the beginning of the summer, more than one of which often takes flight when a swarm departs.

A young queen is in a condition to lead a swarm from a hive in which she was born, in four or five days after she has appeared in it with wings: and when she has resolved on her journey, her eggs have been already impregnated; as appears evidently from there being swarms among which there is not a single male, and from eggs having been found in cells within 24 hours after the settling of the swarm. The bees of a swarm are in a great hurry when they know that their queen is ready to lay. In this case, they give to their new cells but part of the depth they are to have, and defer the finishing of them till they have traced the number of cells requisite for the present time. The cells first made are intended only for working bees; these being the most necessary.

When the hive is become too much crowded, by the addition of the young brood, a part of the bees think of finding themselves a more commodious habitation, and with that view single out the most forward of the young queens. A new swarm is therefore constantly composed of one queen at least, and of several thousand working bees, as well as of some hundreds of drones. The working bees are some old, some young.

Scarce has the colony arrived at its new habitation, when the working bees labour with the utmost diligence to procure materials for food and building. Their principal aim is not only to have cells in which they may deposit their honey. A stronger motive seems to animate them. They seem to know that their queen is in haste to lay her eggs. Their industry is such, that in twenty-four hours they will have made combs twenty inches long, and wide in proportion. They make more wax during the first fortnight, if the season is favourable, than they do during all the rest of the year. Other bees are at the same time busy in stopping all the holes and crevices they find in their new hive, in order to guard against the entrance of insects which covet their honey, their wax, or themselves; and also to exclude the cold air, for it is indispensibly necessary that they be lodged warm.

When the bees first settle in swarming, indeed when they

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Of their
swarming

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they at any time rest themselves, there is something very particular in their method of taking their repose. It is done, by collecting themselves in a heap, and hanging to each other by their feet. They sometimes extend these heaps to a considerable length. It would seem probable to us, that the bees from which the others hang must have a considerable weight suspended to them. All that can be said is, that the bees must find this to be a situation agreeable to themselves. They may perhaps have a method of diffending themselves with air, thereby to lessen their specific gravity; in the same manner as fishes do, in order to alter their gravity compared with water.

When a swarm divides into two or more bands, which settle separately; this division is a sure sign that there are two or more queens among them. One of these clusters is generally larger than the other. The bees of the smaller cluster, or clusters, detach themselves by little and little, till at last the whole, together with the queen or queens, unite with the larger cluster. As soon as the bees are settled, the supernumerary queen, or queens, must be sacrificed to the peace and tranquillity of the hive. This execution generally raises a considerable commotion in the hive; and several other bees, as well as the queen or queens, lose their lives. Their bodies may be observed on the ground, near the hive. The queen that is chosen is of a more reddish colour than those which are destroyed: so that fruitfulness seems to be a great motive of preference in bees; for the nearer they are to the time of laying their eggs, the bigger, larger, and more shining are their bodies. The method of hiving these swarms may be explained hereafter; see n° 2.

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infects.

Besides the capital instincts above mentioned, bees are possessed of others, some of which are equally necessary for their preservation and happiness.—They anxiously provide against the entrance of insects into the hive, by gluing up with wax the smallest holes in the skep. Some stand as centinels at the mouth of the hive, to prevent insects of any kind from getting in. But if a snail, or other large insect, should get in, notwithstanding all resistance, they sting it to death; and then cover it over with a coat of propolis, to prevent the bad smell or maggots which might proceed from the putrefaction of such a large animal.—Bees seem to be warned of the appearance of bad weather by some particular feeling. It sometimes happens, even when they are very assiduous and busy, that they on a sudden cease from their work; not a single one stirs out; and those that are abroad hurry home in such prodigious crowds, that the doors of their habitations are too small to admit them. On this occasion, look up to the sky, and you will soon discover some of those black clouds which denote impending rain. Whether they fee the clouds gathering for it, as some imagine, or whether (as is much more probable) they feel some other effects of it upon their bodies, is not yet determined; but it is certain, that no bee is ever caught even in what we call a sudden shower, unless it have been at a very great distance from the hive, or have been before injured by some accident, or be sickly, and unable to fly so fast as the rest.—Cold is a great enemy to them. To defend themselves against its effects during a cold winter, they crowd together in the middle of the hive, and buzz about, and thereby excite a warmth which

is often perceptible by laying the hand upon the glass-windows of the hive.—They seem to understand one another by the motions of their wings: When the queen wants to quit the hive, she gives a little buzz, and all the others immediately follow her example, and retire along with her.

II. Of the MANAGEMENT of BEES, and most approved Inventions for saving their Lives while we take their Honey and Wax.

1. *Of the Apiary, and Hives.* Columella directs ¹⁸ Of the api-
^{ary.} that the apiary face the south, and be situated in a place neither too hot, nor too much exposed to the cold: that it be in a valley, in order that the loaded bees may with the greater ease descend to their homes: that it be near the mansion-house, on account of the conveniency of watching them; but so situated as not to be exposed to noisome smells, or to the din of men or cattle: that it be surrounded with a wall, which however should not rise above three feet high: that, if possible, a running stream be near them; or, if that cannot be, that water be brought near them in troughs, with pebbles or small stones in the water, for the bees to rest on while they drink; or that the water be confined within gently declining banks, in order that the bees may have safe access to it; they not being able to produce either combs, honey, or food for their maggots, without water: that the neighbourhood of rivers or basons of water with high banks be avoided, because winds may whirl the bees into them, and they cannot easily get on shore from thence to dry themselves; and that the garden in which the apiary stands be well furnished with such plants as afford the bees plenty of good pasture. The trees in this garden should be of the dwarf kind, and their heads bushy, in order that the swarms which settle on them may be the more easily hived.

The proprietor should be particularly attentive that the bees have also in their neighbourhood such plants as yield them plenty of food. Columella enumerates many of these fitted to a warm climate: among them he mentions thyme, the oak, the pine, the sweet-smelling cedar, and all fruit-trees. Experience has taught us, that furze, broom, mustard, clover, heath, &c. are excellent for this purpose. Pliny recommends broom, in particular, as a plant exceedingly grateful and very profitable to bees.

With regard to hives, those made of straw are generally preferred, on several accounts: they are not liable to be over-heated by the rays of the sun; they keep out cold better than wood or any other materials; and the cheapness renders the purchase of them easy. As the ingenious Mr Wildman's hives are reckoned to be of a preferable construction to any other, we shall give an account of them in his own words.

“ My hives,” says he, “ are seven inches in height, and ten in width. The sides are upright, so that the top and bottom are of the same diameter. A hive holds nearly a peck. In the upper row of straw, there is a hoop of about half an inch in breadth; to which are nailed five bars of deal, full a quarter of an inch in thickness, and an inch and quarter wide, and half an inch asunder from one another; a narrow short bar is nailed at each side, half an inch distant from the bars next them, in order to fill up the remaining parts of the

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Of hives.

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or Bee.

the circle; so that there are in all seven bars of deal, to which the bees fix their combs. The space of half an inch between the bars allows a sufficient and easy passage for the bees from one comb to another. In order to give great readiness to the combs, so that, upon moving the hive, the combs may not fall off, or incline out of their direction, a stick should be run thro' the middle of the hive, in a direction directly across the bars, or at right angles with them. When the hives are made, a piece of wood should be worked into the lower row of straw, long enough to allow a door for the bees, of four inches in length, and half an inch in height.

"The proprietor of the bees should provide himself with several flat covers of straw, worked of the same thickness as the hives, and a foot in diameter, that so it may be of the same width as the outside of the hives. Before the cover is applied to the hive, a piece of clean paper, of the size of the top of the hive, should be laid over it; and a coat of cow-dung, which is the least apt to crack of any cement easily to be obtained, should be laid all round the circumference of the hive. Let the cover be laid upon this, and made fast to the hive with a packing-needle and pack-thread, so that neither cold nor vermin may enter.

"Each hive should stand single on a piece of deal, or other wood, somewhat larger than the bottom of the hive: That part of the stand which is at the mouth of the hive should project some inches, for the bees to rest on when they return from the field. This stand should be supported upon a single post, two and a half feet high; to which it should be screwed very securely, that high winds, or other accidents, may not blow down both stand and hive. A quantity of foot mixed with barley-chaff should be sowed on the ground round the post; which will effectually prevent ants, slugs, and other vermin, from rising up to the hive. The foot and chaff should, from time to time, be renewed as it is blown or washed away; though, as it is sheltered by the stand, it remains a considerable time, especially if care be taken that no weeds rise through it. Weeds, indeed, should not be permitted to rise near the hive; for they may give shelter to vermin which may be hurtful to the bees.

"The stands for bees should be four yards asunder; or, if the apiary will not admit of so much, as far asunder as may be, that the bees of one hive may not interfere with those of another hive, as is sometimes the case when the hives are near one another or on the same stand; for the bees, mistaking their own hives, light sometimes at the wrong door, and a fray ensues, in which one or more may lose their lives.

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Of the proper
season
for purchas-
ing hives of
bees.

"The person who intends to erect an apiary, should purchase a proper number of hives at the latter part of the year, when they are cheapest. The hives should be full of combs, and well stored with bees. The purchaser should examine the combs, in order to know the age of the hives. The combs of that season are white, those of the former year are of a darkish yellow; and where the combs are black, the hives should be rejected, because old hives are most liable to vermin, and other accidents.

"If the number of hives wanted were not purchased in the autumn, it will be necessary to remedy this neglect after the severity of the cold is past in the spring.

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or Bee.

At this season, bees which are in good condition will get into the fields early in the morning, return loaded, enter boldly, and do not come out of the hive in bad weather; for when they do, this indicates they are in great want of provisions. They are alert on the least disturbance, and by the loudness of their humming we judge of their strength. They preserve their hives free from all filth, and are ready to defend it against every enemy that approaches.

"The summer is an improper time for buying bees, because the heat of the weather softens the wax, and thereby renders the combs liable to break, if they are not very well secured. The honey too, being then thinner than at other times, is more apt to run out of the cells; which is attended with a double disadvantage, namely, the loss of the honey, and the daubing of the bees, whereby many of them may be destroyed. A first and strong swarm may indeed be purchased; and, if leave can be obtained, permitted to stand in the same garden till the autumn; but, if leave is not obtained, it may be carried away in the night after it has been hived.

"I suppose, that, in the stocks purchased, the bees are in hives of the old construction. The only direction here necessary is, that the first swarm from these stocks should be put into one of my hives; and that another of my hives should in a few days be put under the old stock, in order to prevent its swarming again."

2. *Of Hiving.* Bees, as has been already observed, never swarm till the hive be too much crowded by the young brood. They first begin to swarm in May, or in the end of April, but earlier or later according to the warmth of the season. They seldom swarm before ten in the morning, and seldom later than three in the afternoon. We may know when they are about to swarm, by clusters of them hanging on the outside of the hive, and by the drones appearing abroad more than usual: But the most certain sign is, when the bees refrain from flying into the fields, though the season be inviting. Just before they take flight, there is an uncommon silence in the hive; after this, as soon as one takes flight, they all follow. Before the subsequent swarmings, there is a great noise in the hives, which is supposed to be occasioned by a contest whether the young or the old queen should go out. When the bees of a swarm fly too high, they are made to descend lower, by throwing handfuls of sand or dust among them, which they probably mistake for rain. For the same purpose, it is usual to beat on a kettle or frying-pan: This practice may have taken its rise from observing that thunder or any great noise prompts such bees as are in the fields to return home.

As soon as the swarm is settled, the bees which compose it should be got into a hive with all convenient speed, to prevent their taking wing again. If they settle on a small branch of a tree, easy to come at, it may be cut off and laid upon a cloth; the hive being ready immediately to put over them. If the branch cannot be conveniently cut, the bees may be swept from off it into a hive. Lodge but the queen into the hive, and the rest will soon follow. If the bees must be considerably disturbed in order to get them into a hive, the most advisable way is to let them remain in the place where they have pitched, till the evening, when there is less danger of their taking wing. If it be observed, that

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Of hiving
the swarm.

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that they still hover about the place they first alighted upon; the branches there may be rubbed with rue, or elder-leaves, or any other thing distasteful to them, to prevent their returning to it.

The hive employed on this occasion should be cleaned with the utmost care, and its inside be rubbed very hard with a coarse cloth, to get off the loose straws, or other impurities, which might cost them a great deal of time and labour to gnaw away. It may then be rubbed with fragrant herbs or flowers, the smell of which is agreeable to the bees; or with honey.

The hive should not be immediately set on the stool where it is to remain; but should be kept near the place at which the bees settled, till the evening, lest some stragglers should be lost. It should be shaded, either with boughs or with a cloth, that the too great heat of the sun may not annoy the bees.

We sometimes see a swarm of bees, after having left their hive, and even alighted upon a tree, return to their first abode. This never happens but when the young queen did not come forth with them, for want of strength, or perhaps courage to trust to her wings for the first time; or possibly from a consciousness of her not being impregnated.

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Of uniting
swarms.

When a swarm is too few in number for a hive, another may be added. The usual method of thus uniting swarms is very easy. Spread a cloth at night upon the ground close to the hive in which the two casts or swarms are to be united; lay a stick across this cloth; then fetch the hive with the new swarm, set it over the stick, give a smart stroke on the top of the hive, and all the bees will drop down upon the cloth, in a cluster. This done, throw aside the empty hive, take the other from off the stool, and set this last over the bees, who will soon ascend into it, mix with those already there, and become one and the same family. Others, instead of striking the bees down upon the cloth, place with its bottom upmost the hive in which the united swarms are to live, and strike the bees of the other hive down into it. The former of these hives is then restored to its natural situation, and the bees of both hives soon unite. If some bees still adhere to the other hive, they may be brushed off on the cloth, and they will soon join their brethren. Or one may take the following method, which gives less disturbance to the bees. Set with its mouth upmost the hive into which the young swarm has been put, and set upon it the other hive. The bees in the lower hive, finding themselves in an inverted situation, will soon ascend into the upper.

Though all writers acknowledge, that one of the queens is constantly slain on these occasions, and generally a considerable number of the working bees; yet none of them, Columella excepted, has proposed the easy remedy of killing the queen of the latter cast or swarm before the union is made; a means by which the lives of the working bees may be preserved. This may be done, either by intoxicating them, and then picking her out; or by searching her out when the bees are beaten down upon the cloth; for this being done in the night, to prevent the battle which might otherwise ensue, there will be no great difficulty in finding her.

A large swarm may weigh eight pounds, and so gradually less, to one pound: consequently a very good

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one may weigh five or six pounds. All such as weigh less than four pounds should be strengthened, by uniting to each of them a less numerous swarm. The size of the hive should be proportioned to the number of the bees; and, as a general rule, it should be rather under than over sized, because bees require to be kept warmer than a large hive will admit of.

3. *Of shifting the Abode of Bees.* Great improvements may certainly be made in the essential article of providing plenty of pasture for bees, whenever this subject shall be more carefully attended to than it has hitherto been. A rich corn country is well known to be a barren desert to them during the most considerable part of the year; and therefore the practice of other nations, in shifting the places of abode of their bees, well deserves our imitation.

Columella informs us, that, as few places are so happily situated as to afford the bees proper pasture both in the beginning of the season and also in the autumn, it was the advice of Celsus, that, after the vernal pastures are consumed, the bees should be transported to places abounding with autumnal flowers; as was practised by conveying the bees from Achaia to Attica; from Eubœa and the Cyclad islands to Scyros; and also in Sicily, where they were brought to Hybla from other parts of the island.

We find by Pliny, that this was likewise the practice of Italy in his time. "As soon," says he, "as the spring-food for bees has failed in the valleys near our towns, the hives of bees are put into boats, and carried up against the stream of the river, in the night, in search of better pasture. The bees go out in the morning in quest of provisions, and return regularly to their hives in the boats, with the stores they have collected. This method is continued, till the sinking of the boats to a certain depth in the water shews that the hives are sufficiently full; and they are then carried back to their former homes, where their honey is taken out of them." And this is still the practice of the Italians who live near the banks of the Po, (the river which Pliny intimated particularly in the above-quoted passage).

M. Maillet relates, in his curious description of Egypt, that, "in spite of the ignorance and rusticity which have got possession of that country, there yet remain in it several footsteps of the industry and skill of the ancient Egyptians. One of their most admirable contrivances is, their sending their bees annually into distant countries, in order to procure them sustenance there, at a time when they could not find any at home; and their afterwards bringing them back, like shepherds who should travel with their flocks, and make them feed as they go. It was observed by the ancient inhabitants of lower Egypt, that all plants blossomed, and the fruits of the earth ripened, above six weeks earlier in upper Egypt, than with them. They applied this remark to their bees; and the means then made use of by them, to enable these usefully industrious insects to reap advantage from the more forward state of nature there, were exactly the same as are now practised, for the like purpose, in that country. About the end of October, all such inhabitants of the lower Egypt as have hives of bees, embark them on the Nile, and convey them upon that river quite into upper Egypt; observing to time it so that they arrive there just when the

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Shifting the
bees in
search of
pasture.

Lib. ix. c. 14.

Lib. xxi.
c. 12.Vol. II.
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inundation is withdrawn, the lands have been sown, and the flowers begin to bud. The hives thus sent are marked and numbered by their respective owners, and placed pyramidically in boats prepared for the purpose. After they have remained some days at their farthest station, and are supposed to have gathered all the wax and honey they could find in the fields within two or three leagues around; their conductors convey them, in the same boats, two or three leagues lower down, and there leave the laborious insects so long time as is necessary for them to collect all the riches of this spot. Thus, the nearer they come to the place of their more permanent abode, they find the productions of the earth, and the plants which afford them food, forward in proportion. In fine, about the beginning of February, after having travelled through the whole length of Egypt, gathering all the rich produce of the delightful banks of the Nile, they arrive at the mouth of that river, towards the ocean; from whence they set out, and from whence they are now returned to their several homes: for care is taken to keep an exact register of every district from whence the hives were sent in the beginning of the season, of their numbers, of the names of the persons who sent them, and likewise of the mark or number of the boat in which they were placed."

In many parts of France, floating-bee-houses are very common. They have on board one barge, three-score or an hundred bee-hives, well defended from the inclemency of an accidental storm. With these the owners suffer themselves to float gently down the river, the bees continually choosing their flowery pasture along the banks of the stream; and thus a single floating-bee-house yields the proprietor a considerable income.

They have also a method of transporting their bees by land, well worth our imitation in many parts of this kingdom. Their first care is, to examine those hives, some of whose honey-combs might be broken or separated by the jolting of the vehicle; they are made fast one to the other, and against the sides of the hive, by means of small sticks, which may be disposed differently as occasion will point out. This being done, every hive is set upon a packing-cloth, or something like it, the threads of which are very wide: the sides of this cloth are then turned up, and laid on the outside of each hive, in which state they are tied together with a piece of small pack-thread wound several times round the hive. As many hives as a cart built for that purpose will hold, are afterwards placed in this vehicle. The hives are set two and two, the whole length of the cart. Over these are placed others; which make, as it were, a second story or bed of hives. Those which are stored with combs should always be turned topsyturvy. It is for the sake of their combs, and to fix them the better, that they are disposed in this manner; for such as have but a small quantity of combs in them, are placed in their natural situation. Care is taken in this stowage, not to let one hive flop up another; it being essentially necessary for the bees to have air; and it is for this reason they are wrapped up in a coarse cloth, the threads of which were wove very wide, in order that the air may have a free passage, and lessen the heat which these insects raise in their hives; especially when they move about very tumultuously, as often happens in these carts. Those used for this purpose in

Yevre, hold from 30 to 48 hives. As soon as all are thus stowed, the caravans set out. If the season is full, they travel only in the night; but a proper advantage is made of cool days. These caravans do not go fast. The horses must not be permitted even to trot; they are led slowly, and through the smoothest roads. When there are not combs in the hives sufficient to support the bees during their journey, the owner takes the earliest opportunity of refilling them wherever they can collect wax. The hives are taken out of the cart, then set upon the ground, and after removing the cloth from over them, the bees go forth in search of food. The first field they come to serves them as an inn. In the evening, as soon as they are all returned, the hives are shut up; and being placed again in the cart, they proceed in their journey. When the caravan is arrived at the journey's end, the hives are distributed in the gardens, or in the fields adjacent to the houses of different peasants, who, for a very small reward, undertake to look after them. Thus it is that, in such spots as do not abound in flowers at all seasons, means are found to supply the bees with food during the whole year.

These instances of the great advantages which attend shifting of bees in search of pasture, afford an excellent lesson in this kingdom: they direct particularly the inhabitants of the rich vales, where the harvest for bees ends early, to remove their stocks to places which abound in heath, this plant continuing in bloom during a considerable part of autumn, and yielding great plenty of food to bees. Those in the neighbourhood of hills and mountains will save the bees a great deal of labour, by taking also the advantage of shifting their places of abode.

4. *Of feeding and defending Bees in Winter.* Providence has ordained, that insects which feed on leaves, flowers, and green succulent plants, are in an insensible or torpid state from the time that the winter's cold has deprived them of the means of subsistence. Thus the bees, during the winter, are in so lethargic a state, that little food supports them: but as the weather is very changeable, and every warm or sunny day revives them, and prompts them to return to exercise, food becomes necessary on these occasions.

Many hives of bees, which are thought to die of cold in the winter, in truth die of famine; when a rainy summer has hindered the bees from laying in a sufficient store of provisions. The hives should therefore be carefully examined in the autumn, and should then weigh at least 18 pounds.

Columella describes an annual distemper which seizes bees in the spring, when the spurge blossoms, and the elm discloses its seeds; for that, being allured by the first flowers, they feed so greedily upon them, that they surfeit themselves, and die of a looseness, if they are not speedily relieved.

The authors of the *Maison Rustique* impute this purging to the bees feeding on pure honey, which does not form a food sufficiently substantial for them, unless they have bee-bread to eat at the same time; and advise giving them a honey-comb taken from another hive, the cells of which are filled with crude wax or bee-bread.

There is still, however, a want of experiments to ascertain both the time and the manner in which bees should be fed. The common practice is to feed them

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in the autumn, giving them as much honey as will bring the whole weight of the hive to near 20 pounds. To this end, the honey is diluted with water, and then put into an empty comb, split reeds, or, as Columella directs, upon clean wool, which the bees will suck perfectly dry. But the dilution with water makes the honey apt to be candied, and honey in that state is prejudicial to bees.

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The following directions given in the *Maison Rustique* seem to be very judicious. Replenish the weak hives, in September, with such a portion of combs full of honey taken from other hives, as shall be judged to be a sufficient supply for them. In order to do this, turn up the weak hive, after taking the precaution of defending yourself with the smoke of rags, cut out the empty combs, and put the full ones in their place; where secure them with pieces of wood run a-crofs, in such manner that they may not fall down when the hive is returned to its place. The bees will soon fix them more effectually. If this method be thought too troublesome, set under the hive a plate of liquid honey, unmixed with water, with straws laid a-crofs it, and over these a paper pierced full of holes, through which the bees will suck the honey without daubing themselves. This should be done in cloudy or rainy weather, when the bees stir least abroad; and the hive should be covered, to protect the bees from robbers, who might be allured to it by the smell of the honey.

Another circumstance which may render it very necessary to feed the bees, is, when several days of bad weather ensue immediately after they have swarmed; for then, being destitute of every supply beyond what they carried with them, they may be in great danger of starving. In this case, honey should be given them in proportion to the duration of the bad weather.

The degree of cold which bees can endure has not been ascertained. We find that they live in the cold parts of Russia, and often in hollow trees, without any care being taken of them. Their hives are frequently made of the bark of trees, which does not afford them much protection from cold. Mr White, therefore, judiciously observes, that bees which stand on the north side of a building whose height intercepts the sun's beams all the winter, will waste less of their provisions (almost by half) than others which stand in the sun: for coming seldom forth, they eat little; and yet, in the spring, are as forward to work and swarm, as those which had twice as much honey in the autumn before. The owner should, however, examine their state in the winter; and if he finds, that, instead of being clustered between the combs, they fall down in numbers on the floor or bottom of the hive, the hive should be carried to a warmer place, where they will soon recover. He must be cautious in returning them again to the cold, lest the honey be candied.

Where the winters are extremely severe, the authors of the *Maison Rustique* advise, to lay on the bottom of an old cask the depth of half a foot of very dry earth, powdered, and pressed down hard, and to set on this the floor with the hive; then, to preserve a communication with the air, which is absolutely necessary, to cut a hole in the cask, opposite to the mouth of the hive, and place a piece of reed, or of alder made hollow, from the mouth of the hive to the hole in the cask; and after this to cover the hive with more of the same dry earth. If

there be any room to fear that the bees will not have a sufficiency of food, a plate with honey, covered as before directed, may be put under the hive. If the number of hives be great, boxes may be made of deals nailed together, deep enough to contain the hives when covered with dry earth. The bees will thus remain all the winter free from any danger from cold, hunger, or enemies.

5. *Of taking the Honey and Wax.* In this country it is usual, in seizing the stores of these little animals, to rob them also of their lives. The common method is, That when those which are doomed for slaughter have been marked out (which is generally done in September), a hole is dug near the hive, and a stick, at the end of which is a rag that has been dipped in melted brimstone, being stuck in that hole, the rag is set on fire, the hive is immediately set over it, and the earth is instantly thrown up all around, so that none of the smoke can escape. In a quarter of an hour, all the bees are seemingly dead; and they will soon after be irrecoverably so, by being buried in the earth that is returned back into the hole. By this last means it is that they are absolutely killed: for it has been found by experiment, that all the bees which have been affected only by the fume of the brimstone, recover again, excepting such as have been singed or hurt by the flame. Hence it is evident, that the fume of brimstone might be used for intoxicating the bees, with some few precautions. The heaviest and the lightest hives are alike treated in this manner; the former, because they yield the most profit, with an immediate return; and the latter, because they would not be able to survive the winter. Those hives which weigh from 15 to 20 pounds are thought to be the fittest for keeping.

More humane and judicious methods were practised by the ancients†; and the following simple method is at this day practised in Greece, degenerate as it is. "Mount Hymethus is celebrated for the best honey in all Greece. This mountain was not less famous in times past for bees and admirable honey; the ancients believing that bees were first bred here, and that all other bees were but colonies from this mountain; which if so, we assured ourselves that it must be from this part of the mountain that the colonies were sent; both because the honey here made is the best, and that here they never destroy the bees. It is of a good confidence, of a fair gold-colour, and the same quantity sweetens more water than the like quantity of any other doth. I no sooner knew that they never destroy or impair the stock of bees in taking away their honey, but I was inquisitive to understand their method of ordering the bees; which being an art so worthy the knowledge of the curious, I shall not think it beside the purpose, to relate what I saw, and was informed of to that effect by such as had skill in that place.

"The hives they keep their bees in are made of willows or osiers, fashioned like our common dust-baskets, wide at top and narrow at the bottom, and plattered with clay or loam within and without. They are set as in fig. 13. with the wide end uppermost. The tops are covered with broad flat sticks, which are also plattered over with clay; and, to secure them from the weather, they cover them with a tuft of straw, as we do. Along each of these sticks, the bees fall their combs; so that a comb may be taken out whole, with-

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† Vide *Chulmella*, lib. ix. c. 15. and *Jarrs de Re Rustica*, lib. iii. c. 16.
25
Greck method of taking the honey with the bees. See *Wheeler's Journey into Greece*, p. 411.

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out the least bruising, and with the greatest ease imaginable. To increase them in spring-time, that is in March or April, until the beginning of May, they divide them; first separating the sticks on which the combs and bees are fastened, from one another, with a knife: so, taking out the first comb and bees together on each side, they put them into another basket, in the same order as they were taken out, until they have equally divided them. After this, when they are again accommodated with sticks and plaster, they set the new basket in the place of the old one, and the old one in some new place. And all this they do in the middle of the day, at such time as the greatest part of the bees are abroad; who at their coming home, without much difficulty, by this means divide themselves equally. This device hinders them from swarming and flying away. In August, they take out their honey. This they do in the day-time also, while they are abroad; the bees being thereby, say they, disturbed least: at which time they take out the combs laden with honey, as before; that is, beginning at each out-side, and so taking away, until they have left only such a quantity of combs, in the middle, as they judge will be sufficient to maintain the bees in winter; sweeping those bees that are on the combs into the basket again, and then covering it with new sticks and plaster."

The Greek method above related was introduced into France in 1754, as we are informed by M. de Reaumur and Du Hamel, in the Memoirs of the Royal Academy for that year, p. 331.

Attempts have been made in our own country, to attain the desirable end of getting the honey and wax without destroying the bees; the most approved of which we shall now relate as concisely as possible.

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Mr Thorley's observations, &c.

Mr Thorley, in his *Inquiry into the Nature, Order, and Government of Bees*, thinks colonies preferable to hives, for the following reasons: *First*, The more certain preservation of very many thousands of these useful creatures; *secondly*, Their greater strength (which consists in numbers), and consequently their greater safety from robbers; *thirdly*, Their greater wealth, arising from the united labours of the greater number. He tells us, that he has in some summers taken two boxes filled with honey from one colony; and yet sufficient store has been left for their maintenance during the winter; each box weighing 40 pounds. Add to these advantages, the pleasure of viewing them, with the greatest safety, at all seasons, even in their busiest time of gathering, and their requiring a much less attendance in swarming time. The bees thus managed are also more effectually secured from wet and cold, from mice and other vermin.

His boxes are made of deal, which, being spongy, sucks up the breath of the bees sooner than a more solid wood would do. Yellow dram-deal thoroughly seasoned is the best.

An octagon, being nearer to a sphere, is better than a square form; for as the bees, in winter, lie in a round body near the centre of the hive, a due heat is then conveyed to all the out-parts, and the honey is kept from candying.

The dimensions which Mr Thorley, after many years experience, recommends for the boxes, are ten inches depth, and 12 or 14 inches breadth in the inside. He has tried boxes containing a bushel or more, but found

them not to answer the design like those of a lesser size. The larger are much longer in filling; so that it is later ere you come to reap the fruits of the labour of the bees; nor is the honey there so good and fine, the effluvia even of their own bodies tainting it.

The best and purest honey is that which is gathered in the first five or six weeks: and in boxes of less dimensions you may take in a month or little more, provided the season be favourable, a box full of the finest honey.

The top of the box should be made of an entire board a full inch thick after it has been planed; and it should project on all sides at least an inch beyond the dimensions of the box. In the middle of this top there must be a hole five inches square, for a communication between the boxes; and this hole should be covered with a sliding shutter, of deal or elm, running easily in a groove over the back window. The eight panels, nine inches deep, and three quarters of an inch thick when planed, are to be let into the top so far as to keep them in their proper places; to be secured at the corners with plates of brass, and to be cramped with wires at the bottom, to keep them firm: for the heat in summer will try their strength. There should be a glass-window behind, fixed in a frame, with a thin deal-cover, two small brass hinges, and a button to fasten it. This window will be sufficient for inspecting the progress of the bees. Two brass handles, one on each side, are necessary to lift up the box: these should be fixed in with two thin plates of iron, near three inches long, so as to turn up and down, and put three inches below the top-board, which is nailed close down with sprips to the other parts of the box.

Those who chuse a frame within, to which the bees may fasten their combs, need only use a couple of deal sticks of an inch square, placed a-cross the box, and supported by two pins of brass; one an inch and half below the top, and the other two inches below it; by which means the combs will quickly find a rest. One thing more, which perfects the work, is, a passage, four or five inches long, and less than half an inch deep, for the bees to go in and out at the bottom of the box.

1. In keeping bees in colonies, an house is necessary, or at least a shade; without which the weather, especially the heat of the sun, would soon rend the boxes to pieces.

Your house may be made of any boards you please, but deal is the best. Of whatever sort the materials are, the house must be painted, to secure it from the weather.

The length of this house, we will suppose for six colonies, should be full 12 feet and an half, and each colony should stand a foot distance from the other. It should be three feet and an half high, to admit four boxes one upon another; but if only three boxes are employed, two feet eight inches will be sufficient. Its breadth in the inside should be two feet. The four corner-poits should be made of oak, and well fixed in the ground, that no stormy winds may overturn it; and all the rails should be of oak, supported by several up-rights of the same, before and behind, that they may not yield or sink under 6, 7, or 800 weight, or upwards. The floor of the house (about two feet from the ground) should be strong and smooth, that the

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lowest box may stand close to it.

This floor may be made with boards or planks of deal the full length of the bee-house; or, which is preferable, with a board or plank to each colony, of two feet four inches long, and fixed down to the rails; and that part which appears at the front of the house may be cut into a femicircle, as a proper alighting place for the bees. Plane it to a slope, that the wet may fall off. When this floor to a single colony wants to be repaired, it may easily be removed, and another be placed in its room, without disturbing the other colonies, or touching any other part of the floor.

Upon this floor, at equal distances, all your colonies must be placed, against a door or passage cut in the front of the house.

Only observe farther, to prevent any false step, that as the top-board of the box (being a full inch broader than the other part) will not permit the two mouths to come together, you must cut a third in a piece of deal of a sufficient breadth, and place it between the other two, so close, that not a bee may get that way into the house. And fixing the said piece of deal down to the floor with two lath-nails, you will find afterwards to be of service, when you have occasion either to raise a colony, or take a box of honey, and may prove a means of preventing a great deal of trouble and mischief.

The house being in this forwardness, you may cover it to your own mind, with boards, fine slates, or tiles. But contrive their position so as to carry off the wet, and keep out the cold, rain, snow, or whatever might any way hurt and prejudice them.

The back-doors may be made of half-inch deal, two of them to shut close in a rabbit, cut in an upright pillar, which may be so contrived, as to take in and out, by a mortise in the bottom rail, and a notch in the inside of the upper rail, and fastened with a strong hasp. Place these pillars in the spaces between the colonies.

Concluding your house made after this model, without front doors, a weather-board will be very accessory to carry the water off from the places where the bees settle and rest.

Good painting will be a great preservative. Forget not to paint the mouths of your colonies with different colours, as red, white, blue, yellow, &c. in form of a half-moon, or square, that the bees may the better know their own home. Such diversity will be a direction to them.

Thus your bees are kept warm in the coldest winter; and in the hottest summer greatly refreshed by the cool air, the back-doors being set open, without any air-holes made in the boxes.

Dr Warder observes, that in June, July, and August, when the colonies come to be very full, and the weather proves very hot, the appearance of a shower drives the bees home in such crowds, that pressing to get in, they stop the passage so close, that those within are almost suffocated for want of air; which makes these last so uneasy, that they are like mad things. In this extremity, he has lifted the whole colony up a little on one side; and by thus giving them air, has soon quieted them. He has known them, he says, come pouring out, on such an occasion, in number sufficient to have filled at once two or three quarts; as if they had been going to swarm. To prevent this inconve-

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nience, he advises cutting a hole two inches square in, about the middle of one of the hinder panels of each box. Over this hole, nail, in the inside of the box, a piece of tin-plate punched full of holes so small that a bee cannot creep through them; and, have over it, on the outside, a very thin slider, made to run in grooves; so that, when it is thrust home, all may be close and warm; and when it is opened, in very hot weather, the air may pass through the holes, and prevent the suffocating heat. Or holes may be bored in the panels themselves, on such an emergency, in a colony already settled.

Such a thorough passage for the air may be convenient in extreme heat, which is sometimes so great as to make the honey run out of the combs. The Memoirs of the truly laudable Berne Society, for the year 1764, give us a particular instance of this, when they say, that, in 1761, many in Switzerland were obliged to smother their bees, when they saw the honey and wax trickling down; not knowing any other remedy for the losses they daily sustained. Some shaded their hives from the sun, or covered them with clothes wet several times a-day, and watered the ground all around.

The best time to plant the colonies is, either in spring with new stocks full of bees, or in summer with swarms. If swarms are used, procure, if possible, two of the same day: hive them either in two boxes, or in a hive and a box: at night, place them in the bee-house, one over the other; and, with a knife and a little lime and hair, stop close the mouth of the hive, or upper box, so that not a bee may be able to go in or out, but at the front-door. This done, you will, in a week or ten days, with pleasure see the combs appear in the boxes; but if it be an hive, nothing can be seen till the bees have wrought down into the box. Never plant a colony with a single swarm, as Mr Thorley says he has sometimes done, but with little success.

When the second box, or the box under the hive, appears full of bees and combs, it is time to raise your colony. This should be done in the dusk of the evening, and in the following manner.

Place your empty box, with the sliding shutter drawn back, behind the house, near the colony that is to be raised, and at nearly the height of the floor: then, lifting up the colony with what expedition you can, let the empty box be put in the place where it is to stand, and the colony upon it; and shut up the mouth of the then upper box with lime and hair, as before directed.

When, by the help of the windows in the back of the boxes, you find the middle box full of combs, and a quantity of honey sealed up in it, the lowest box half full of combs, and few bees in the uppermost box, proceed thus.

About five o'clock in the afternoon, drive close, with a mallet, the sliding shutter under the hive or box that is to be taken from the colony. If the combs are new, the shutter may be forced home without a mallet; but be sure it be close, that no bees may ascend into the hive or box to be removed. After this, shut close the doors of your house, and leave the bees thus cut off from the rest of their companions, for the space of half an hour or more. In this space of time, having lost their queen, they will fill themselves with honey, and be impatient to be set at liberty.

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If, in this interval, you examine the box or boxes beneath, and observe all to be quiet in them, you may be confident that the queen is there, and in safety. Hereupon raise the back part of the hive or box so far, by a piece of wood slipped under it, as to give the prisoners room to come out, and they will return to their fellows: then lifting the box from off the colony, and turning its bottom upmost, cover it with a cloth all night; and the next morning, when this cloth is removed, the bees that have remained in it will return to the colony. Thus you have a hive or box of honey, and all your bees safe.

If the bees do not all come out in this manner, Dr Warder's method may be followed, especially if it be with a hive. It is, to place the hive with the small end downward in a pail, peck, or flower-pot, so as to make it stand firm: then to take an empty hive, and set it upon the former, and to draw a cloth tight round the joining of the two hives, so that none of the bees may be able to get out: after this, to strike the full hive so smartly as to disturb the bees that are in it, but with such pauses between the strokes as to allow them time to ascend into the empty hive, which must be held fast whilst this is doing, lest it fall off by the shaking of the other. When you perceive by the noise of the bees in the upper hive, that they are got into this last, carry it to a cloth spread for this purpose before the colony, with one end fastened to the landing-place, and knock them out upon it: they will soon crawl up the cloth, and join their fellows, who will gladly receive them.

Mr Thorley next gives an account of his narcotic, and of the manner of using it.

The method which he has pursued with great success, for many years, and which he recommends to the public, as the most effectual for preserving bees in common hives, is incorporation, or uniting two stocks into one, by the help of a peculiar fume or opiate, which will put them entirely in your power for a time, to divide and dispose of at pleasure. But as that dominion over them will be of short duration, you must be expeditious in this business.

The queen is immediately to be searched for, and killed. Hives which have swarmed twice, and are consequently reduced in their numbers, are the fittest to be joined together, as this will greatly strengthen and improve them. If a hive which you would take is both rich in honey, and full of bees, it is but dividing the bees into two parts, and putting them into two boxes, instead of one. Examine whether the stock to which you intend to join the bees of another, have honey enough in it to maintain the bees of both: it should weigh full 20 pounds.

The narcotic, or stupifying fume, is made with the *fungus maximus* or *pulverulentus*, the large mushroom, commonly known by the name of *binet*, *puckfish*, or *frog-cheese*. It is as big as a man's head, or bigger: when ripe, it is of a brown colour, turns to powder, and is exceeding light. Put one of these pucks into a large paper, press it therein to two-thirds or near half the bulk of its former size, and tie it up very close: then put it into an oven some time after the household bread has been drawn, and let it remain there all night: when it is dry enough to hold fire, it is fit for use. The manner of using it is thus:

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Cut off a piece of the puck, as large as a hen's egg, and fix it in the end of a small stick slit for that purpose, and sharpened at the other end; which place so that the puck may hang near the middle of an empty hive. This hive must be set with the mouth upward, in a pail or bucket which should hold it steady, near the stock you intend to take. This done, set fire to the puck, and immediately place the stock of bees over it, tying a cloth round the hives, that no smoke may come forth. In a minute's time, or little more, you will hear the bees fall like drops of hail into the empty hive. You may then beat the top of the full hive gently with your hand, to get out as many of them as you can: after this, loosing the cloth, lift the hive off to a table, knock it several times against the table, several more bees will tumble out, and perhaps the queen among them. She often is one of the last that falls. If she is not there, search for her among the main body in the empty hive, spreading them for this purpose on a table.

You must proceed in the same manner with the other hive, with the bees of which these are to be united. One of the queens being secured, you must put the bees of both hives together, mingle them thoroughly, and drop them among the combs of the hive which they are intended to inhabit. When they are all in, cover it with a packing or other coarse cloth which will admit air, and let them remain shut up all that night and the next day. You will soon be sensible that they are awaked from this sleep.

The second night after their union, in the dusk of the evening, gently remove the cloth from off the mouth of the hive, (taking care of yourself), and the bees will immediately rally forth with a great noise; but being too late, they will soon return: then, inserting two pieces of tobacco-pipes to let in air, keep them confined for three or four days, after which the door may be left open.

The best time for uniting bees is, after their young brood are all out, and before they begin to lodge in the empty cells. As to the hour of the day, he advises young practitioners to do it early in the afternoon, in order that, having the longer light, they may the more easily find out the queen. He never knew such combined stocks conquered by robbers. They will either swarm in the next summer, or yield an hive full of honey.

Mr N. Thorley, son of the above-mentioned clergyman, has added to the edition which he has given of his father's book, a postscript, purporting, that persons who chuse to keep bees in glass-hives may, after uncovering the hole at the top of a flat-topped straw-hive, or box, place the glass over it so close, that no bee can go in or out but at the bottom of the hive or box. The glass-hive must be covered with an empty hive, or with a cloth, that too much light may not prevent the bees from working. As soon as they have filled the straw-hive or box, they will begin to work up into the glass-hive. He tells us, that he himself has had one of these glass-hives filled by the bees in 30 days, in a fine season; and that it contained 38 pounds of fine honey. When the glass is completely filled, slide a tin-plate between it and the hive or box, so as to cover the passage, and in half an hour the glass may be taken off with safety. What few bees remain in it, will readily

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go to their companions. He has added a glass window to his straw-hives, in order to see what progress bees make; which is of some importance, especially if one hive is to be taken away whilst the season still continues favourable for their collecting of honey: for when the combs are filled with honey, the cells are sealed up, and the bees forsake them, and reside mostly in the hive in which their works are chiefly carried on. Observing also that the bees were apt to extend their combs thro' the passage of communication in the upper hive, whether glass or other, which rendered it necessary to divide the comb when the upper hive was taken away, he now puts in that passage a wire screen, or netting, the meshes of which are large enough for a loaded bee to go easily through them. This prevents the joining of the combs from one box to the other, and consequently obviates the necessity of cutting them, and of spilling some of the honey, which, running down among a crowd of bees, used before to incommode them much, it being difficult for them to clear their wings of it.

24 PL. XXV.

39
Of bees in
boxes, and
method of
taking their
honey and
wax.

Fig. 14. is a drawing of one of his colonies.

2. The reverend Mr White informs us, that his fondness for these little animals soon put him upon endeavouring, if possible, to save them from fire and brimstone; that he thought he had reason to be content to share their labours for the present, and great reason to rejoice if he could at any time preserve their lives, to work for him another year; and that the main drift of his observations and experiments has therefore been, to discover an easy and cheap method, suited to the abilities of the common people, of taking away so much honey as can be spared, without destroying or starving the bees; and by the same means to encourage seasonable swarms.

In his directions how to make the bee-boxes of his inventing, he tells us, speaking of the manner of constructing a single one, that it may be made of deal or any other well-seasoned boards which are not apt to warp or split. The boards should be near an inch thick; the figure of the box square, and its height and breadth nine inches and five eighths, every way measuring within. With these dimensions it will contain near a peck and an half. The front-part must have a door cut in the middle of the bottom-edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to pass through, yet not be large enough for their enemy the mouse to enter. In the back-part you must cut a hole with a rabbit in it, in which you are to fix a pane of the clearest and best crown-glass, about five inches in length and three in breadth, and fasten it with putty: let the top of the glass be placed as high as the roof within-side, that you may see the upper part of the combs, where the bees with their riches are mostly placed. You will, by this means, be better able to judge of their state and strength, than if your glass was fixed in the middle. The glass must be covered with a thin piece of board, by way of shutter, which may be made to hang by a string, or turn upon a nail, or slide sideways between two mouldings. Such as are desirous of seeing more of the bees works, may make the glass as large as the box will admit without weakening it too much; or they may add a pane of glass on the top, which must likewise be covered with a shutter, fastened down with pegs, to prevent accidents.

The side of the box which is to be joined to another box of the same form and dimensions, as it will not be exposed to the internal air, may be made of a piece of slit deal not half an inch thick. This he calls the side of communication, because it is not to be wholly inclosed: a space is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height; and a hole or passage is to be made at top, three inches long, and more than half an inch wide. Through these the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burdens, may readily and easily ascend into either of the boxes. The upper communication is only intended as a passage between the boxes, resembling the little holes, or narrow passes, which may be observed in the combs formed by our sagacious architects, to save time and shorten the way when they have occasion to pass from one comb to another; just as, in populous cities, there are narrow lanes and alleys passing transversely from one large street to another.

In the next place you are to provide a loose board, half an inch thick, and large enough to cover the side where you have made the communications. You are likewise to have in readiness several little iron staples, an inch and half long, with the two points or ends bended down more than half an inch. The use of these will be seen presently.

You have now only to fix two sticks crossing the box from side to side, and crossing each other, to be a stay to the combs; one about three inches from the bottom, the other the same distance from the top; and when you have painted the whole, to make it more durable, your box is finished.

The judicious bee-master will here observe, that the form of the box now described is as plain as is possible for it to be. It is little more than five square pieces of board nailed together; so that a poor cottager, who has but ingenuity enough to saw a board into the given dimensions, and to drive a nail, may make his own boxes well enough, without the help or expence of a carpenter.

No directions are necessary for making the other box, which must be of the same form and dimensions. The two boxes differ from each other only in this, that the side of communication of the one must be on your right hand; of the other, on your left. Fig. 15. re-^{ad} PL. XXV. presents two of these boxes, with their openings of communication, ready to join to each other.

Mr White's manner of hiving a swarm into one or both of these boxes, is thus:

You are to take the loose board, and fasten it to one of the boxes, so as to stop the communications. This may be done by three of the staples before mentioned; one on the top of the box near the front; the two others on the back, near the top and near the bottom. Let one end of the staple be thrust into a gimlet-hole made in the box, so that the other end may go as tight as can be over the loose board, to keep it from slipping when it is handled. The next morning, after the bees have been hived in this box, the other box should be added, and the loose board should be taken away. This will prevent a great deal of labour to the bees, and some to the proprietor.

Be careful to fasten the shutter so close to the glass,
that

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that no light may enter through it; for the bees seem to look upon such light as a hole or breach in their house, and on that account may not so well like their new habitation. But the principal thing to be observed at this time, is to cover the box, as soon as the bees are hived, with a linen cloth thrown loosely over it, or with green boughs, to protect it from the piercing heat of the sun. Boxes will admit the heat much sooner than straw-hives; and if the bees find their house too hot for them, they will be wise enough to leave it. If the swarm be larger than usual, instead of fastening the loose board to one box, you may join two boxes together with three staples, leaving the communication open from one to the other, and then hive your bees into both. In all other respects, they are to be hived in boxes after the same manner as in common hives.

The door of the second box should be carefully stopped up, and be kept constantly closed, in order that the bees may not have an entrance but thro' the first box.

When the boxes are set in the places where they are to remain, they must be screened from the summer's sun, because the wood will otherwise be heated to a greater degree than either the bees or their works can bear; and they should likewise be screened from the winter's sun, because the warmth of this will draw the bees from that lethargic state which is natural to them, as well as many other insects, in the winter-season. For this purpose, and also to shelter the boxes from rain, our ingenious clergyman has contrived the following frame.

ad Pl. XXV. Fig. 12. represents the front of a frame for twelve colonies. *a, a*, are two cells of oak, lying flat on the ground, more than four feet long. In these cells you are to fix four oaken posts, about the thickness of such as are used for drying linen.

The two posts *b, b*, in the front, are about six feet two inches above the cells: the other two, standing backward, five feet eight inches.

You are next to nail some boards of slit deal horizontally from one of the fore-posts to the other, to screen the bees from the sun. Let these boards be seven feet seven inches in length, and nailed to the inside of the posts; and be well seasoned, that they may not shrink or gape in the joints.

c, c, Are two splines of deal, to keep the boards even, and strengthen them.

Fig. 17. represents the back of the frame. *d, d, d, d*, Are four strong boards of the same length with the frame, on which you are to place the boxes. Let the upper side of them be very smooth and even, that the boxes may stand true upon them: or it may be still more advisable, to place under every pair of boxes a smooth thin board, as long as the boxes, and about a quarter of an inch wider. The bees will soon fasten the boxes to this board, in such manner, that you may move or weigh the boxes and board together, without breaking the wax or resin, which for many reasons ought to be avoided. These floors must be supported by pieces of wood, or bearers, *e, e*, &c. which are nailed from post to post at each end. They are likewise to be well nailed to the frame, to keep them from sinking with the weight of the boxes.

f Represents the roof, which projects backward about seven or eight inches beyond the boxes, to shelter them from rain.

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or Bec.

You have now only to cut niches or holes in the frame, over against each mouth or entrance into the boxes, at *b, b, b*, in fig. 16. Let these niches be near four inches long; and under each you must nail a small piece of wood for the bees to alight upon.

The morning or evening sun will shine upon one or both ends of the frame, let its aspect be what it will: but you may prevent its over-heating the boxes, by a loose board set up between the posts, and kept in by two or three pegs.

The same gentleman, with great humanity, observes, that no true lover of bees ever lighted the fatal match without much concern; and that it is evidently more to our advantage, to spare the lives of our bees, and be content with part of their stores, than to kill and take possession of the whole.

About the latter end of August, says he, by a little inspection through your glasses, you may easily discover which of your colonies you may lay under contribution. Such as have filled a box and an half with their works, will pretty readily yield you the half box. But you are not to depend upon the quantity of combs without examining how they are stored with honey. The bees should, according to him, have eight or nine pounds left them, by way of wages for their summer's work.

The most proper time for this business is the middle of the day; and as you stand behind the frame, you will need no armour, except a pair of gloves. The operation itself is very simple, and easily performed, thus: Open the mouth of the box you intend to take; then, with a thin knife, cut through the resin with which the bees have joined the boxes to each other, till you find that you have separated them; and after this, thrust a sheet of tin gently in between the boxes. The communication being hereby stopped, the bees in the fullest box, where it is most likely the queen is, will be a little disturbed at the operation; but those in the other box where we suppose the queen is not, will run to and fro in the utmost hurry and confusion, and send forth a mournful cry, easily distinguished from their other notes. They will issue out at the newly opened door; not in a body as when they swarm, nor with such calm and cheerful activity as when they go forth to their labours; but by one or two at a time, with a wild flutter, and visible rage and disorder. This, however, is soon over: for as soon as they get abroad and spy their fellows, they fly to them instantly and join them at the mouth of the other box. By this means, in an hour or two, for they go out slowly, you will have a box of pure honey, without leaving a bee in it to molest you; and likewise without dead bees, which, when you burn them, are often mixed with your honey, and both waste and damage it.

Mr White acknowledges, that he has sometimes found this method fail, when the mouth of the box to be taken away has not been constantly and carefully closed: the bees will, in this case, get acquainted with it as an entrance; and when you open the mouth in order to their leaving this box, many of them will be apt to return, and, the communication being stopped, will, in a short time, carry away all the honey from this to the other box; so much do they abhor a separation. When this happens, he has recourse to the following expedient, which he thinks infallible. He takes

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or Bee.

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or Bee.

takes a piece of deal, a little larger than will cover the mouth of the box, and cuts in it a square nich somewhat more than half an inch wide. In this nich he hangs a little trap-door, made of a thin piece of tin, turning upon a pin, with another pin crossing the nich a little lower, so as to prevent the hanging door from opening both ways. This being placed close to the mouth, the bees which want to get out will easily thrust open the door outwards, but cannot open it the other way, to get in again; so mult, and will readily, make to the other box, leaving this in about the space of two hours, with all its store, justly due to the tender hearted bee-maister, as a ransom for their lives.

What led Mr White to prefer collateral boxes to those before in use, was, to use his own words, his "compassion for the poor bees, who, after traversing the fields, return home weary and heavy laden, and must perhaps deposit their burden up two pair of stairs, or in the garret. The lower room, it is likely, is not yet furnished with stairs: for, as is well known, our little architects lay the foundation of their structures at the top, and build downward. In this case, the weary little labourer is to drag her load up the sides of the walls: and when she has done this, she will travel many times backward and forward, as I have frequently seen, along the roof, before she finds the door or passage into the second story; and here again she is perplexed with a like puzzling labyrinth, before she gets into the third. What a waste is here of that precious time which our bees value so much, and which they employ so well! and what an expence of strength and spirits, on which their support and sustenance depend! In the collateral boxes, the rooms are all on the ground-floor; and because I know my bees are wise enough to value convenience more than state, I have made them of such a moderate, though decent, height, that the bees have much less way to climb to the top of them, than they have to the crown of a common hive."

30
Of the management of
Bees in
Mr Wildman's hives.

Mr Wildman's hives have been already described, (n° 19, 20.) A good swarm will soon fill one of these hives, and therefore another hive may be put under it the next morning. The larger space allowed the bees, will excite their industry in filling them with combs. The queen will lay some eggs in the upper hive; but so soon as the lower hive is filled with combs, she will lay most of them in it. In little more than three weeks, all the eggs laid in the upper hive will be turned into bees; and if the season is favourable, their cells will be soon filled with honey.

So soon as they want room, a third hive should be placed under the two former; and in a few days after the end of three weeks from the time the swarm was put into the hive, the top hive may be taken away at noon of a fair day; and if any bees remain in it, carry it to a little distance from the stand, and, turning its bottom up, and striking it on the sides, the bees will be alarmed, take wing, and join their companions in the second and third hives. If it is found that the bees are very unwilling to quit it, it is probable that the queen remains among them. In this case, the bees must be treated in the manner that shall be directed, when we describe Mr Wildman's method of taking the honey and the wax, (n° 31.) The upper hive now taken away should be put in a cool place, in which no vermin, mice,

&c. can come at the combs, or other damage can happen to them, and be thus preserved in reserve.

So soon as the hives seem to be again crowded, and the upper hive is well stored, or filled with honey, a fourth hive should be placed under the third, and the upper hive be taken off the next fair day at noon, and treated as already directed. As the honey made during the summer is the best, and as it is needless to keep many full hives in store, the honey may be taken out of the combs of this second hive for use.

If the season is very favourable, the bees may still fill a third hive. In this case, a fifth hive must be put under the fourth, and the third taken away as before. The bees will then fill the fourth for their winter-store.

As the honey of the first hive is better than the honey collected so late as that in the third, the honey may be taken out of the combs of the first, and the third may be preserved with the same care as directed for that.

In the month of September, the top hive should be examined: if full, it will be a sufficient provision for the winter; but if light, that is, not containing 20 pounds of honey, the more the better, then, in the month of October, the fifth hive should be taken away, and the hive kept in reserve should be put upon the remaining one, to supply the bees with abundant provisions for the winter. Nor need the owner grudge them this ample store; for they are faithful stewards, and will be proportionally richer, and more forward in the spring and summer, when he will reap an abundant profit. The fifth hive which was taken away should be carefully preserved during the winter, that it may be restored to the same stock of bees, when an additional hive is wanted next summer; or the first swarm that comes off may be put into it. The combs in it, if kept free from filth and vermin, will save much labour, and they will at once go to the collecting of honey.

It is still needless to observe, that when the hives are changed, a cover, as already directed (see n° 19.) should be put upon every upper hive; and that when a lower hive becomes an upper hive, the door of it should be shut up, that so their only passage out shall be by the lower hive; for otherwise the queen would be apt to lay eggs in both indiscriminately. The whole of the above detail of the management of one hive, may be extended to any number; it may be proper to keep a register to each set, because, in restoring hives to the bees, they may be better pleased at receiving their own labours, than that of other stocks.

If in the autumn the owner has some weak hives, which have neither provision nor numbers sufficient for the winter, it is advisable to join the bees to richer hives: for the greater number of bees will be a mutual advantage to one another during the winter, and accelerate their labours much in the spring. For this purpose, carry a poor and a richer hive into a room, a little before night: then force the bees out of both hives into two separate empty hives, in a manner that shall be hereafter directed: shake upon a cloth the bees out of the hive which contains the fewest; search for the queen; and as soon as you have secured her with a sufficient retinue, bring the other hive which contains the greater number, and place it on the cloth on which the other bees are, with a support under one side, and with a spoon shovel the bees under it. They will soon

U u u ascend;

*Apis,
or Bee.*

ascend; and, while under this impression of fear, will unite peaceably with the other bees; whereas, had they been added to the bees of the richer hive, while in possession of their cattle, many of the new-comers must have paid with their lives for their intrusion.

It appears from the account of the management of bees in Mr Wildman's hives, that there is very little art wanting to cause the bees to quit the hives which are taken away, unless a queen happens by chance to be among them. In that case, the same means may be used as are necessary when we would rob one of the common hives of part of their wealth. The method is as follows:

31
*His method
of taking
the honey
and wax.*

Remove the hive, from which you would take the wax and honey, into a room, into which admit but little light, that it may at first appear to the bees as if it was late in the evening. Gently invert the hive, placing it between the frames of a chair, or other steady support, and cover it with an empty hive, keeping that side of the empty hive raised a little, which is next the window, to give the bees sufficient light to get up into it. While you hold the empty hive steadily supported on the edge of the full hive, between your side and your left arm, keep striking with the other hand all round the full hive from top to bottom, in the manner of beating a drum, so that the bees may be frightened by the continued noise from all quarters; and they will in consequence mount out of the full hive into the empty one. Repeat the strokes rather quick than strong round the hive, till all the bees are got out of it, which in general will be in about five minutes. It is to be observed, that the fuller the hive is of bees, the sooner they will have left it. As soon as a number of them have got into the empty hive, it should be raised a little from the full one, that the bees may not continue to run from the one to the other, but rather keep ascending upon one another.

So soon as all the bees are out of the full hive, the hive in which the bees are must be placed on the stand from which the other hive was taken, in order to receive the absent bees as they return from the fields.

If this is done early in the season, the operator should examine the royal cells, that any of them that have young in them may be saved, as well as the combs which have young bees in them, which should on no account be touched, though by sparing them a good deal of honey be left behind. Then take out the other combs, with a long, broad, and pliable knife, such as the apothecaries make use of. The combs should be cut from the sides and crown as clean as possible, to save the future labour of the bees, who must lick up the honey spilt, and remove every remains of wax; and then the sides of the hive should be scraped with a table-spoon, to clear away what was left by the knife. During the whole of this operation, the hive should be placed inclined to the side from which the combs are taken, that the honey which is spilt may not daub the remaining combs. If some combs were unavoidably taken away, in which there are young bees, the parts of the combs in which they are should be returned into the hive, and secured by sticks in the best manner possible. Place the hive then for some time upright, that any remaining honey may drain out. If the combs are built in a direction opposite to the entrance, or at right angles with it, the combs which are the furthest from

the entrance are to be preferred; because there they are best flored with honey, and have the fewest young bees in them.

Having thus finished taking the wax and honey, the next business is to return the bees to their old hive; and for this purpose place a table covered with a clean cloth, near the stand, and giving the hive in which the bees are a sudden shake, at the same time striking it pretty forcibly, the bees will be shaken on the cloth. Put their own hive over them immediately, raised a little on one side, that the bees may the more easily enter; and when all are entered, place it on the stand as before. If the hive, in which the bees are, be turned bottom uppermost, and their own hive be placed over it, the bees will immediately ascend into it, especially if the lower hive is struck on the sides to alarm them.

As the chief object of the bees, during the spring, and beginning of the summer, is the propagation of their kind, honey, during that time, is not collected in such quantity as it is afterwards: and on this account it is scarcely worth while to rob a hive before the latter end of June; nor is it safe to do it after the middle of July, lest rainy weather may prevent their restoring the combs they have lost, and laying in a stock of honey sufficient for the winter, unless there is a chance of carrying them to a rich pasture.

EXPLANATION OF THE PLATES.

PLATE XXV. Fig. 1. is the queen-bee. 2. Is the drone. 3. Is the working bee. 4. Represents the bees hanging to each other by the feet, which is the method of taking their repose. 5. The proboscis or trunk, which is one of the principal organs of the bees, wherewith they gather the honey and take their nourishment. 6. One of the hind-legs of a working-bee, loaded with wax. 7. A comb, in which the working bees are bred. The cells are the smallest of any. Two of them have the young bees inclosed. A royal cell is suspended on one side. 8. A comb in which the drones are bred, being larger than the former; the young drones being included in several of them; with two royal cells suspended on the side. 9. A similar comb, in which the royal cell is fixed in the middle of the comb; and several common cells are sacrificed to serve as a basis and support to it. In general, the royal cells are suspended on the side of a comb, as in fig. 7, 8. To the side of fig. 9. two royal cells are begun, when they resemble pretty much the cup in which an acorn lies. The other royal cells have the young queens included in them.

24 PLATE XXV. Fig. 1. exhibits the sting and all its parts. The sting is composed of a sheath or case, and two shanks, united to each other, and terminating in a sharp point, so as to look like a single part. *b*, The poisonous bag. *c*, The tube that serves to convey the poison from its bag to the thickest part of the sting's sheath. *d d*, The two shanks of the sting, mutually conveying to each other. *e e*, The sheath of the sting. *f f*, The thickest end of the sheath, where the tube opens into it, by which it receives the insect's poison. *g*, The extreme point of the sting, formed by the two shanks of that organ, that are in this place closely united. *h h*, The beards with which the shanks of the sting are armed at their extremities. *i*, The tube that serves to secrete the poison, which it discharges into the

*Apis,
or Bee.*

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 10.
ARANEÆ TARANTULA



Fig. 5.



Fig. 6.



Fig. 8.

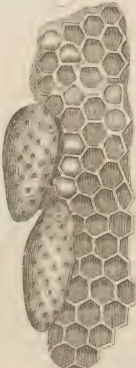


Fig. 7.

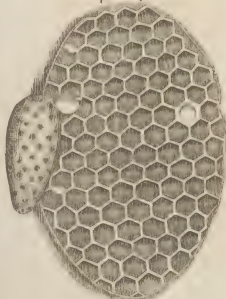
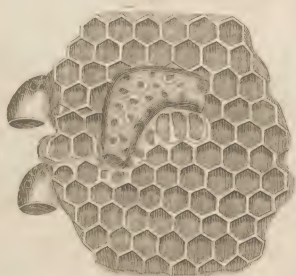


Fig. 9.





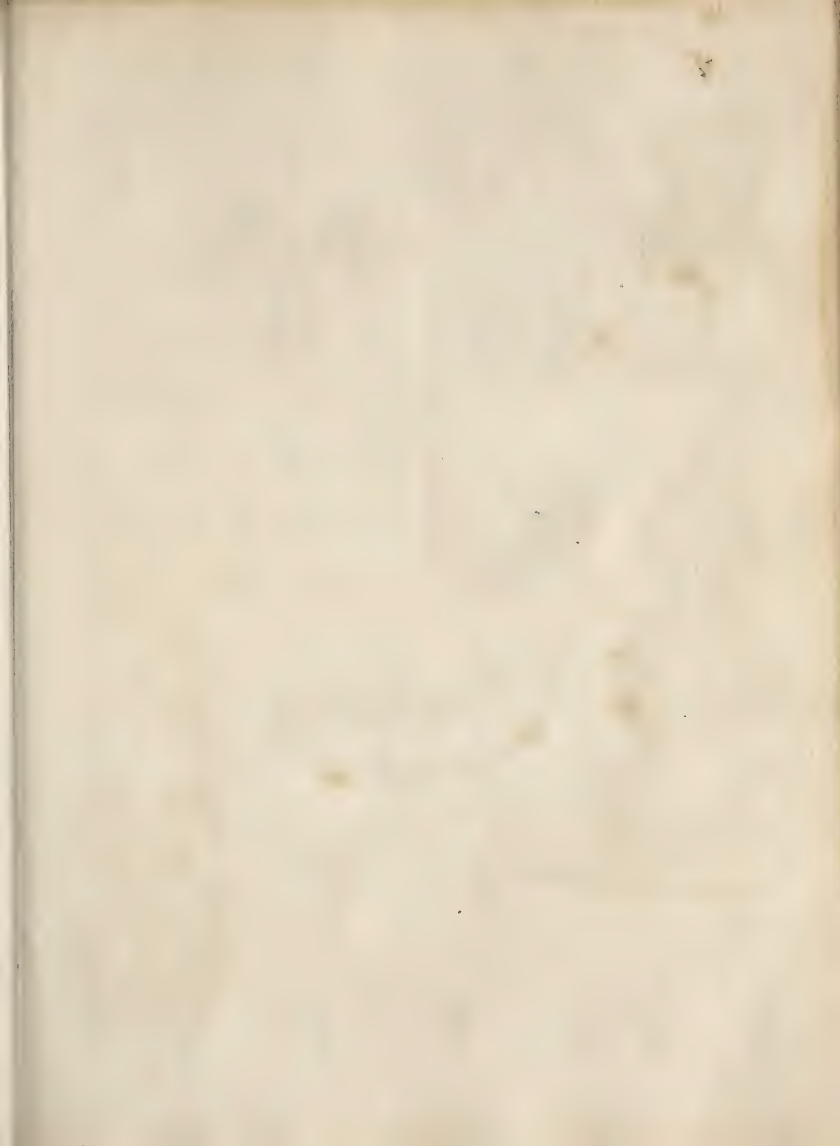


Fig. 13.



Fig. 15.



Fig. 16.

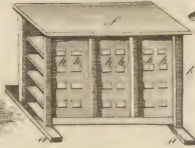


Fig. 14.



Fig. 17.

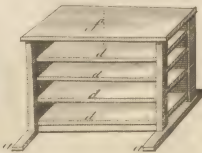


Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

Fig. 6.

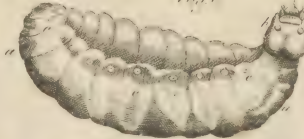


Fig. 11.



Fig. 12.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



the poison-bag. *kk*, The two blind extremities of said tube. *lll*, Two pair of cartilages, of different forms, which are for the most part of a deep black, and articulated among themselves and with the shanks of the sting. *mm*, Two other cartilages less conspicuous than the former, with one pair of which they are articulated. These two cartilages *mm*, are almost entirely of a membranaceous substance. *nnnnnnnn*, Eight places in which the foregoing cartilages are articulated among themselves, and with the shanks of the sting *dd*. *oooo*, Four muscles serving to move the sting different ways, by the assistance of the same cartilages. *pp*, Two muscles which draw the shanks of the sting into its sheath. *gg*, Two appendages of the sting which are moved along with it, and seem to answer no other purpose but that of ornament.—Fig. 2. The ovary.—Fig. 3. Six eggs drawn after nature, and placed on their ends: These eggs are oblong, very slender, but somewhat thicker on their upper parts.—Fig. 4. An egg viewed with a microscope: it resembles the skin of a fish, divested of its scale, but still retaining the marks of their inflection.—Fig. 5. Worms of bees of different sizes, drawn after nature. *a*, A worm newly hatched. *bcdg*, Four worms that received more nourishment, and are more grown. *fg*, Two worms still bigger than the former, having had more time to make use of the nourishment provided for them. They are here represented as they lie doubled in their cells. *h*, A worm placed on its belly, so as to shew on its back a black line, inclining to a light blue or grey. This line denotes the stomach, which appears in this place through the transparent parts that lie over it. *i*, A worm lying on its back, and beginning to draw in the hinder part of its body, and move its head.—Fig. 6. A full-grown worm viewed with a microscope. *aa*, Its 14 annular incisions or divisions. *b*, The head and eyes, &c. *ccc*, Ten breathing holes.—Fig. 7. The worm forming its web. *aa*, The sides of the cell that contain it. *b*, The bottom of the cell. *c*, The entrance or door of the cell. The worm is here represented as making its web in the properest manner to shut up this entrance.—Fig. 8. Worm taken out of the web in which it had inclosed itself, and just ready to cast its skin.—Fig. 9. A cell containing the worm changed into a nymph, and perfectly lined with the said worm's web. Likewise the said web entire, with the nymph contained in it, as they appear on opening the cell. *aa*, The sides of the cell, lined with the worm's web. *b*, The mouth of the cell, perfectly closed by the web. *c*, The bottom of the cell. *d*, The web entire, as it appears on opening the cell, which it greatly resembles in form. *e*, The upper part of the web, of a convex form. This part shews its filaments pretty distinctly. *f*, The inclosed nymph appearing through the transparent sides of the web. *g*, The bottom of the web, answering to that of the wax-cell.—Fig. 10. Worm changed to a nymph, of its natural size and form, yet so as to exhibit its limbs, which are folded up in a most wonderful manner.—Fig. 11. The nymph of the bee viewed with the microscope, displaying in a distinct manner all the parts of the inclosed insect, and the beautiful manner in which they are laid up. *a*, The head, bloated with humours. *bb*, The eyes, projecting considerably. *cc*, The horns, or antennæ. *d*, The

lip. *ee*, The teeth, or jaw-bones. *ff*, The first pair of joints belonging to the proboscis. *h*, The proboscis itself. *ii*, The first pair of legs. *kk*, Two transparent stiff little parts, lying against the lowest joints of the first pair of legs. These little parts are not to be found as they remain in the skin it sheds on quitting the nymph state. *ll*, The second pair of legs. *mm*, The wings. *nn*, The blade-bones. *oo*, The last pair of legs. *pp*, The abdominal rings. *q*, (*g*) The hinder part of the body. The sting projects a little in this place. *r*, Two little parts accompanying the sting. *s*, The anus.—Fig. 12. *a*, A cell full of bees-bread, placed in layers. *b*, Little grains, of which the said substance, viewed with the microscope, appears to consist.—The other figures have been already described.

Other Species of APIS.

The most remarkable are, 2. The centuncularis, or black bee, having its belly covered with yellow down. The nests of this species are made of rose-leaves curiously plaited in the form of a matt or quilt. 3. The florissomnis, or black bee with a cylindrical incurved belly, having two tooth-like protuberances at the anus, and a kind of prickles on the hind-legs. This bee sleeps in flowers. 4. The dentata, or shining green bee, with black wings, and a kind of teeth on the hind thighs. The tongue of this bee is almost as long as its body. 5. The variegata: the breast and belly are variegated with white and black spots; the legs are of an iron colour. It is a native of Europe. This species sleeps in the geranium phaeum, or spotted crane's-bill. 6. The rostrata is distinguished by the upper lip being inflected and of a conical shape, and by the belly being invested with bluish belts. They build their nests in high sandy grounds, and there is but one young in each nest. 7. The ferruginea, or smooth black bee, with the feelers, mouth, belly, and feet, of an iron colour. This is a small bee, and supposed to be of an intermediate kind between the bee and wasp. It is a native of Europe. 8. The cariosa is a yellowish hairy bee; and the feet and front are of a bright yellow colour. It builds in the rotten trees of Europe. 9. The violacea is a red bee, and very hairy, with bluish wings. It is a native of Europe. The violacea is said to perforate trees, and hollow them out in a longitudinal direction; they begin to build their cells at the bottom of these holes, and deposit an egg in each cell, which is composed of the farina of plants and honey, or a kind of gluten. 10. The terrestris is black and hairy, with a white belt round the breast, and a white anus: it builds its nest very deep in the earth. 11. The lapidaria, or red hairy bee, with a yellow anus, builds in holes of rocks. 12. The muscorum, or yellow hairy bee, with a white belly, builds in mossy grounds. 13. The hypnorum, or yellow hairy bee, with a black belt on the belly. The last three species are also natives of Europe. 14. The brasiliianum, or pale-red hairy bee, with the basis of the thighs black. This is a very large bee, every where covered with a testaceous skin. It is a native of America.

APIUM, PARSLEY, a genus of the digynia order, belonging to the pentandria class of plants.

Species. Of this genus Dr Linnaeus reckons only two species, the petroelinum and graveolens; but Mr

Apium.

Miller mentions the seven following. 1. The petrofelinum, or common parley, which is generally cultivated for common use, and is what the physicians have distinguished by the name of *petrofelinum*, the graveolens or smallage being constantly mentioned under that of Apium. 2. The crispum, or curled parley, has been generally supposed to be only a variety of the first; but, according to Mr Miller, this is a mistake arising from the seeds of the two sorts being usually mixed in the shops. 3. The latifolium, or large rooted parley, is cultivated on account of its roots, which are as large as common carrots, as well as very tender and sweet. This kind was known in Holland long before the English gardeners could be prevailed upon to raise it. Mr Miller received the seeds from thence in 1727. 4. The graveolens, or smallage, is by Linnaeus joined to the celery; but in this he is greatly mistaken. Mr Miller assures us that he cultivated this plant for forty years together, to try if it could be brought to the same goodness as celery; but without success. It does not grow so tall as celery, nor will it rise with a straight stem; but sends out many suckers near the root, and, when blanched, retains its strong rank taste, which no culture can alter. 5. The dulce, or upright celery. 6. The rapaceum, or turnep-rooted celery. The last of these was supposed to be a degenerate species from the former; but this is likewise denied by Mr Miller. The leaves of the rapaceum are short when compared with those of the dulce, and spread open horizontally; the roots grow as large as common turnips. The only difference observed from culture was, that on rich ground, and where the plants were carefully cultivated, the roots were much larger than on poorer land; but the leaves and outward appearance of the plant never vary. 7. The lustraticum, the seeds of which were received from the royal garden at Paris, and has since been cultivated in some English gardens, and still shews itself to be specifically distinct, but has no remarkable property.

Culture. The common parley must be sown early in the spring, as the seeds remain a long time in the ground, the plants seldom appearing in less than six weeks after sowing. It is generally sown in drills by the edges of borders; it being much easier to keep clear from weeds, by following this method, than if the seeds are sown promiscuously on a border. When it is designed for medicinal use, the seeds must be sown thin; and when the plants come up, they should be hoed out single, as is practised for carrots, onions, &c. observing also to cut up the weeds. If this is observed, the roots will become fit for use in July or August, and continue till the spring. As there is danger of having the leaves of the lesser hemlock mixed with parley, from their near resemblance, it would be proper to cultivate only the curled root, which will be readily known on account of the peculiar form of its leaves. The best time for sowing this species is in the middle or latter end of February. One bushel of seed will sow an acre of land. The large rooted parley may be sown about the same time; and in April, when the plants are up, they must be cut out with a hoe, to five or six inches square, and kept constantly free from weeds. In July, the roots will be fit to draw for use; but if they are cut out so as to allow them more room to grow, the roots will grow, in a good soil, to the

size of a middling parsnep, by September.—Smallage is a common weed by the sides of ditches and brooks in many parts of England, so that it is seldom cultivated in gardens; but if any person is willing to cultivate it, the seeds should be sown soon after they are ripe, on a moist spot of ground; and when the plants are come up, they may be either transplanted on a moist soil, or hoed out, and left six or eight inches asunder where they are to remain.—The seeds of the two sorts of celery should be sown at two or three different times, the better to continue it for use through the whole season, and prevent its running up to seed. The first sowing should be in the beginning of March, on a gentle hot-bed: the second may be a fortnight or three weeks after, which ought to be in an open spot of light earth, where it may enjoy the benefit of the sun: the third time of sowing should be in the end of April or beginning of May, which ought to be in a moist soil; and if exposed to the morning sun only, so much the better, but it should not be under the drip of trees. The seeds which were sown on the hot-bed will come up in about three weeks or a month after sowing, when the plants should be carefully cleared from weeds; and if the season prove dry, they must be carefully watered. In about a month or five weeks after it is up, the plants may be removed to some beds of moist rich earth, in a warm situation, in which they are to be placed at about the distance of three inches from one another. If the season proves cold, they must be covered with mats to screen them from the morning frosts; and, in case of drought, they must be watered till they have taken root.

Medicinal Uses, &c. The roots and seeds of the *petrofelinum* are used in medicine. The root of parley is one of the five aperient roots, and in this intention is sometimes made an ingredient in apozems and diet-drinks: if liberally used, it is apt to occasion flatulencies; and thus, by distending the viscera, produces a contrary effect to that intended by it: the taste of this root is somewhat sweetish, with a light degree of warmth and aromatic flavour. The seeds are an ingredient in the electuary of bay-berries. The roots of *smallage* are also in the number of aperient roots, and have been sometimes prescribed as an ingredient in aperient apozems and diet-drinks, but are at present disregarded. The seeds of the plant are moderately aromatic, and were formerly used as carminatives; in which intention they are, doubtless, capable of doing service, though the other warm seeds, which the shops are furnished with, render these unnecessary; and accordingly the Edinburgh college, which retains the roots, has expunged the seeds.

Besides its medicinal virtues above-mentioned, the common parley is reckoned an effectual cure for the rot in sheep, provided they are fed with it twice a week for two or three hours each time: but hares and rabbits are so fond of this herb, that they will come from a great distance to feed upon it; and in the countries where these animals abound, they will destroy it if not very securely fenced against them; so that whoever has a mind to have plenty of hares in their fields, may draw them from all parts of the country by cultivating parley.

APIUM ANISUM dictum. See PIMPINELLA.

APIUM MACEDONICUM. See BUBON.

APIVORUS,

Apium.

Aplivorus

Apocrypha

APIVORUS, in ornithology, a synonyme of a species of falco. See **FALCO**.

APLUDA, a genus of the monœcia order, belonging to the polygamia class of plants. The calix is a bivalved gluma; the stamules of the female are sessile, and the male stamules are furnished with pedunculi; the female has no calix; the corolla has a double valve; there is but one stylus, and one covered seed. The male has three stamina. There are three species of *apluda*, viz. the mutica, aristata, and zeugites, all natives of the Indies.

AOBATANA, the metropolis of Media, and where the kings kept their treasure, (Isidorus Characenus); supposed to be the same with *Ebatana*.

AOBATERION, in antiquity, a valedictory speech or poem made by a person on departing out of his own country, and addressed to his friends or relations.

AOBATHRA, a place near Sestos, (Strabo); the landing place where Xerxes's ships were frozen, and stuck in the ice, (Eustathius).

APOCALYPSE, REVELATION, the name of one of the sacred books of the New Testament, containing revelations concerning several important doctrines of Christianity.

The word is Greek, and derived from *αποκαλυπτω*, to reveal, or discover.

This book, according to Irenæus, was written about the year 96 of Christ, in the island of Patmos, whither St John had been banished by the emperor Domitian. But Sir Isaac Newton places the writing of it earlier, viz. in the time of Nero. Some attribute this book to the arch-heretic Cerinthus: but the ancients unanimously ascribed it to John, the son of Zebedee, and brother of James; whom the Greek fathers call the *Divine*, by way of eminence, to distinguish him from the other evangelists. This book has not, at all times, been esteemed canonical. There were many churches in Greece, as St Jerome informs us, which did not receive it; neither is it in the catalogue of canonical books prepared by the council of Laodicea, nor in that of St Cyril of Jerusalem: but Justin, Irenæus, Origen, Cyprian, Clemens of Alexandria, Tertullian, and all the fathers of the fourth, fifth, and the following centuries, quote the Revelations as a book then acknowledged to be canonical. The Alogians, Marcionites, Cerdonians, and Luther himself, rejected this book: but the Protestants have forsaken Luther in this particular; and Beza has strongly maintained against his objections, that the *Apocalypse* is authentic and canonical.

The *Apocalypse* consists of twenty-two chapters. The three first are an instruction to the bishops of the seven churches of Asia Minor. The fifteen following chapters contain the persecutions which the church was to suffer from the Jews, heretics, and Roman emperors. Next, St John prophesies of the vengeance of God, which he will exercise against those persecutors, against the Roman empire, and the city of Rome, which, as the Protestants suppose, he describes under the name of Babylon, the great whore, seated upon seven hills. In the last place, the 19th, 20th, 21st, and 22^d chapters, describe the triumph of the church over its enemies, the marriage of the Lamb, and the happiness of the church triumphant.

Apocalypse

Apocrypha

"It is a part of this prophecy (says Sir Isaac Newton), that it should not be understood before the last age of the world; and therefore it makes for the credit of the prophecy, that it is not yet understood. The folly of interpreters has been to foretell times and things by this prophecy, as if God designed to make them themselves. By this rashness they have not only exposed themselves, but brought the prophecy also into contempt. The design of God was much otherwise: he gave this and the prophecies of the Old Testament, not to gratify mens curiosities, by enabling them to foreknow things; but that, after they were fulfilled, they might be interpreted by the events, and his own providence, not the interpreters, be then manifested thereby to the world. And there is already so much of the prophecy fulfilled, that as many as will take pains in this study, may see sufficient instances of God's providence."

There have been several other works published under the title of *Apocalypses*. Sozomen mentions a book used in the churches of Palestine, called the *Apocalypse*, or *Revelation of St Peter*. He also mentions an *Apocalypse* of St Paul; which the Cophitæ retain to this day. Eusebius also speaks of both these *Apocalypses*. St Epiphanius mentions an *Apocalypse* of Adam; Nicephorus, an *Apocalypse* of Esdras; Gratian and Cedrenus, an *Apocalypse* of Moses, another of St Thomas, and another of St Stephen; St Jerom, an *Apocalypse* of Elias. Porphyry, in his life of Plotin, makes mention of the *Apocalypse* or Revelations of Zoroaster, Zostrian, Nicotæus, Allogenes, &c.

APOCOPE, among grammarians, a figure which cuts off a letter or syllable from the end of a word; as *ingeni* for *ingenii*.

APOCRISARIUS, in ecclesiastical antiquity, a sort of resident in an imperial city, in the name of a foreign church or bishop, whose office was to negotiate, as proctor, at the emperor's court, in all ecclesiastical causes in which his principals might be concerned. The institution of the office seems to have been in the time of Constantine, or not long after, when, the emperors being become Christians, foreign churches had more occasions to promote their suits at court than formerly. However, we find it established by law in the time of Justinian. In imitation of this officer, almost every monastery had its *Apocrisarius*, or resident, in the imperial city.

The title and quality of *Apocrisarius* became at length appropriated to the Pope's agent, or *Nuncio*, as he is now called; who resided at Constantinople, to receive the Pope's dispatches, and the emperor's answers. The word is formed from *ἀποκριναι*, to answer.

APOCRUSTICS, in medicine, the same with repellents. See **REPELLENTS**.

APOCRYPHA, or **APOCRYPHAL BOOKS**, such books as are not admitted into the canon of scripture, being either not acknowledged as divine, or spurious.

The word is Greek; and derived from *αποκρυπτω* to hide or conceal.

When the Jews published their sacred books, they gave the appellations of *canonical* and *divine* only to such as they then made public: such as were still retained in their archives they called *apocryphal*, for no other reason but because they were not public; so that

Apocrypha that they might be really sacred and divine, though not promulged as such.

Apocynum.

Thus, in respect of the Bible, all books were called *apocryphal* which were not inserted in the Jewish canon of scripture. Vossius observes, that, with regard to the sacred books, none are to be accounted apocryphal, except such as had neither been admitted into the synagogue nor the church, so as to be added to the canon, and read in public.

The Protestants do not only reckon those books to be apocryphal which are esteemed such in the church of Rome, as the prayer of Manasseh king of Judah, the third and fourth books of Esdras, St Barnabas's epistle, the book of Hermos, the addition at the end of Job, and the 151st psalm; but also Tobit, Judith, Esther, the book of Wisdom, Jesus the son of Sirach, Baruch the prophet, the Song of the Three Children, the history of Susannah, the history of Bell and the Dragon, and the first and second books of Maccabees.

It is now pretended that these books were not received by the Jews, or so much as known to them. None of the writers of the New Testament cite or mention them: neither Philo nor Josephus speak of them. The Christian church was for some ages an utter stranger to these books. Origen, Athanasius, Hilary, Cyril of Jerusalem, and all the orthodox writers, who have given catalogues of the canonical books of scripture, unanimously concur in rejecting these out of the canon. And for the New Testament, they are divided in their opinions, whether the epistle to the Hebrews, the epistle of St James, and the second epistle of St Peter, the second and third epistles of St John, the epistle of St Jude, and the Revelations, are to be acknowledged as canonical or not.

The Protestants acknowledge such books of scripture only to be canonical as were so esteemed to be in the first ages of the church; such as are cited by the earliest writers among the Christians as of divine authority, and after the most diligent inquiry were received and so judged to be by the council of Laodicea. The several epistles abovementioned, and the book of Revelations, whatever the sentiments of some particular persons are or may have been of them, are allowed by all the reformed churches to be parts of the canon of the New Testament.

The apocryphal books, however, according to the sixth article of the church of England, are to be read for example of life and instruction of manners; but it doth not apply them to establish any doctrine.

APOCYNUM, (*Apocynon*, of *apo* and *κυν* a dog, because the ancients believed this plant would kill dogs,) **DOGSHANE**; a genus of the digynia order, belonging to the pentandria class of plants.

Species. Of this genus botanical writers enumerate 11 species; of which the following are the most remarkable: 1. The venetum, with an upright herbaceous stalk, grows on a small island in the sea near Venice, but is supposed to have been originally brought from some other country. There are two varieties of this; one with a purple, and the other with a white flower. The roots creep very much, and by them only it is propagated; for it seldom produces any seeds either in the gardens where it is cultivated, or in those places where it grows naturally. Mr Miller tells us, that he had been assured by a very curious botanist, who

resided many years at Venice, and constantly went to the spot several times in the season to procure the seeds, had any been produced, that he never could find any pods formed on the plants. The stalks rise about two feet high, and are garnished with smooth oval leaves placed opposite; the flowers grow at the top of the stalks, in small umbels, and make a very pretty appearance. The flowers appear in July and August. 2. The speciosissimum, with large flowers, is a native of Jamaica in the Savannas, whence it has the name of *Savannah-flower*, by which it is generally known in that island. This sort rises three or four feet high, having woody stalks, which fend out a few lateral branches, garnished with smooth oval leaves placed by pairs opposite, of a shining green colour on their upper sides, but pale and veined underneath. The flowers are produced from the sides of the branches, upon long foot-stalks: there are commonly four or five buds at the end of each; but there is seldom more than one of them which comes to the flower. The flower is very large, having a long tube which spreads open wide at the top, of a bright yellow, and makes a fine appearance, especially in those places where the plants grow naturally, being most part of the year in flower. 3. Cordatum, with a climbing stalk. 4. The villosum, with hairy flowers and a climbing stalk. These were discovered at La Vera Cruz in New Spain, by Dr William Houston, who sent their seeds to England. They are both climbers, and mount to the tops of the tallest trees. In England they have climbed over the plants in the robes, and risen to upwards of 20 feet high. The third sort has produced flowers several times: but the fourth never shewed an appearance of any.

Culture. The first sort is hardy enough to live in England in the open air, provided it is planted in a warm situation and dry soil. It is propagated, as we have already observed, by its creeping roots; the best time for removing and planting which is in the spring, just before they begin to push out new stalks. The other sorts are propagated by seeds, but are so tender as to require being kept constantly in a stove.

Properties. All the species of this plant abound with a milky juice, which flows out from any part of their stalks and leaves when they are broken: this is generally supposed to be hurtful if taken inwardly, but doth not blister the skin when applied to it as the juice of spurge and other acrid plants. The pods of all the sorts are filled with seeds, which are for the most part compressed and lie over one another *imbricatum*, like the tiles of a house; these have each a long plume of a cottony down fastened to their crowns, by which, when the pods are ripe and open, the seeds are wafted by the wind to a considerable distance, so that the plants become very troublesome weeds. This down is in great esteem in France, for stuffing of easy chairs, making quilts, &c. for it is exceedingly light and elastic. It is called by the French *delawad*; and might probably become a vendible commodity in England, were people attentive to the collecting of it in Jamaica where the plants are found in plenty.

APODECTÆ, in antiquity, a denomination given to ten general receivers appointed by the Athenians to receive the public revenues, taxes, debts, and the like. The apodectæ had also a power to decide controversies arising in relation to money and taxes, all but those

Apocynum

Apocetæ

Apodectæ: those of the most difficult nature and highest concern, which were referred to the courts of judicature.

Apodectæ: **ApODECTÆI**, in the Athenian government, officers appointed to see that the measures of corn were just.

APODES, in a general sense, denotes things without feet. Zoologists apply the name to a fabulous sort of birds, said to be found in some of the islands of the new world, which, being entirely without feet, support themselves on the branches of trees by their crooked bills.

APODES, in the Linnean system, the name of the first order of fishes, or those which have no belly-fins. See **ZOOLOGY**, n° 10.

APODICTICAL, among philosophers, a term importing a demonstrative proof, or systematical method of teaching.

APODOSIS, in rhetoric, makes the third part of a complete exordium, being properly the application, or restriction of the *protasis*. The apodosis is the same with what is otherwise called *axisis*; and stands opposed to *protasis*: e. gr. *protasis*, all branches of history are necessary for a student; *catastasis*, so that, without these, he can never make any considerable figure; *apodosis*, but literary history is of a more essential use, which recommends it, &c.

APODYTERIUM, in the ancient baths, the apartments where persons dressed and undressed.

APOGEE, in astronomy, that point in the orbit of a planet, which is at the greatest distance from the earth. The apogee of the sun is that part of the earth's orbit which is at the greatest distance from the sun; and consequently the sun's apogee, and the earth's aphelion, are one and the same point.

APOLIDES, in antiquity, those condemned for life to the public works, or exiled into some island, and thus divested of the privileges of Roman citizens.

APOLLINARIAN GAMES, in Roman antiquity, were instituted in the year of Rome 542. The occasion was a kind of oracle delivered by the prophet Marcus after the fatal battle at Cannæ, declaring, that to expel the enemy, and cure the people of an infectious disease which then prevailed, sacred games were to be annually performed in honour of Apollo; the prætor to have the direction of them, and the decemviri to offer sacrifices after the Grecian rite. The senate ordered that this oracle should be observed the rather, because another of the same Marcus, wherein he had foretold the overthrow at Cannæ, had come true; for this reason they gave the prætor 12000 asces out of the public cash to defray the solemnity. There were sacrificed an ox to Apollo, as also two white goats, and a cow to Latona: all with their horns gilt. Apollo had also a collection made for him, besides what the people who were spectators gave voluntarily. The first prætor by whom they were held was P. Cornelius Sylla. For some time they were moveable or indistinct; but at length were fixed, under P. Licinius Varus, to the fifth of July, and made perpetual. The men, who were spectators at these games, wore garlands on their heads; the women performed their devotions in the temples at the same time, and at last they caroused together in the vestibles of their houses, the doors standing open. The Apollinarian games were merely scenical; and at first only observed with singing, piping, and other sorts of

music; but afterwards there were also introduced all manner of mountebank-tricks, dances, and the like; yet so as that they still remained scenical, no chariot races, wrestling, or the like laborious exercises of the body, being ever practised at them.

A POLLINARIANS, or **A POLLINARISTS**, in church-history, a sect of heretics who maintained, that Jesus Christ had neither a rational human soul, nor a true body.—Apollinaris of Laodicea, their leader, invested Christ with a fanciful kind of flesh, which he supposed to have existed with the Son from all eternity.—He also distinguished between the soul of Christ, and what the Greeks call *νοῦς*, mind, or understanding; and from this distinction took occasion to assert, that Christ assumed a soul without its understanding, and that this defect was supplied by the Word: tho' some of his followers held that Christ had no human soul at all.—Apollinaris further taught, that the souls of men were propagated by other souls, as well as their bodies.—Theodoret charges him with confounding the persons of the Godhead, and with giving into the errors of Sabellius; and Basil accuses him of abandoning the literal sense of scripture, and taking up wholly with the allegorical sense. The heresy was very subtle, and overspread most of the churches of the east; it was condemned in a synod of Alexandria, under St Athanasius, in the year 362. It was subdivided into several different heresies, the chief whereof were the Dimoerites.

A POLLINARIS (Caius Sulpicius), a very learned grammarian, born at Carthage, lived in the 2^d century, under the Antonines; he is supposed to be the author of the verses which are prefixed to the comedies of Terence, and contain the arguments of them. He had for his successor in the profession of grammar Helvius Pertinax, who had been his scholar, and was at last emperor.

A POLLINARIS SIDONIUS (Caius Sollius), an eminent Christian writer and bishop in the 5th century, was born of a noble family in France. He was educated under the best masters, and made a prodigious progress in the several arts and sciences, but particularly in poetry and polite literature. After he had left the schools, he applied himself to the profession of war. He married Papianilla, the daughter of Avitus, who was consul, and afterwards emperor, by whom he had three children. But Majorianus in the year 457 having deprived Avitus of the empire, and taken the city of Lyons, in which our author resided, Apollinaris fell into the hands of the enemy. However, the reputation of his learning softened Majorianus's resentments, so that he treated him with the utmost civility, in return for which Apollinaris composed a panegyric in his honour; which was so highly applauded, that he had a statue erected to him at Rome, and was honoured with the title of *Count*. In the year 467 the emperor Anthemius rewarded him for the panegyric, which he had written in honour of him, by raising him to the post of governor of Rome, and afterwards to the dignity of a patrician and senator, and erecting a statue to him. But he soon quitted these secular employments for the service of the church. The bishoprick of Clermont being vacant in 472 by the death of Eparchius, Apollinaris, who was then only a layman, was chosen to succeed him without any interest or solicitation on his part,

Apollinaris.
Apollinaris.

Apollina-
ria,
Apollo.

part, in which see he acted with the greatest integrity. Clermont being besieged by the Goths, he animated the people to the defence of that city, and would never consent to the surrender of it; so that, when it was taken about the year 480, he was obliged to retire; but he was soon restored by Evariges king of the Goths, and continued to govern the church as he had done before. He died in peace the 21st of August 487; and his festival is still observed in the church of Clermont, where his memory is had in great veneration. He is esteemed the most elegant writer of his age, both in prose and verse. He wrote a great many little pieces; but preferred none but those which he thought were worthy of being continued down to posterity. He collected himself the nine books which we have remaining of his letters. His chief pieces in poetry are the three panegyrics upon the emperors Avitus, Majorianus, and Anthemius. The rest of them are a collection of poems addressed to his friends upon particular subjects. His letters contain a variety of particulars relating to polite literature and profane history.

APOLLINARIUS (Claudius), a learned bishop of Hierapolis, who, about the year 170, presented to Marcus Aurelius an excellent Apology for the Christians.

APOLLINARIUS THE YOUNGER, thus called to distinguish him from his father, called *Apollinarius the Elder*, was at first lector or reader of Laodicea, and afterwards bishop of that city. He was universally esteemed the greatest man of his age, both for learning and piety, and a most accurate and nervous defender of the faith against all its enemies: but notwithstanding this, on his advancing some opinions that were not approved, he was anathematized as an heretic by the second general council of Constantinople in 381.

APOLLO. Of all the divinities of Paganism, there was no one by whom the polite arts were said to have been in so particular a manner cherished and protected, as by Apollo. Cicero mentions four of his name: the most ancient of whom was the son of Vulcan; the second a son of Corybas, and born in Crete; the third an Arcadian, called *Nomian*, from his being a great legislator; and the last, to whom the greatest honour is ascribed, the son of Jupiter and Latona.

Apollo had a variety of other names, either derived from his principal attributes, or the chief places where he was worshipped. He was called the *Healer*, from his enlivening warmth and cheering influence; *Pæan*, from the pestilential heats: to signify the former, the ancients placed the graces in his right hand; and for the latter, a bow and arrows in his left: *Nemius*, or the shepherd, from his fertilizing the earth, and thence sustaining the animal creation; *Delius*, from his rendering all things manifest; *Pythius*, from his victory over Python; *Lyctas*, *Phœbus*, and *Phanetas*, from his purity and splendor. As Apollo is almost always confounded by the Greeks with the sun, it is no wonder that he should be dignified with so many attributes. It was natural for the most glorious object in nature, whose influence is felt by all creation, and seen by every animated part of it, to be adored as the fountain of light, heat, and life.

The power of healing diseases being chiefly given by the ancients to medicinal plants and vegetable produc-

tions, it was natural to exalt into a divinity the visible cause of their growth. Hence he was styled the *God of Physic*; and that external heat which cheers and invigorates all nature, being transferred from the human body to the mind, gave rise to the idea of all mental effervescence coming from this god; hence, likewise, poets, prophets, and musicians, are said to be *Numine afflatis*, inspired by Apollo.

Whether Apollo was ever a real personage, or only the great luminary, many have doubted. Indeed, Vossius has taken great pains to prove this god to be only a metaphorical being, and that there never was any other Apollo than the sun. "He was styled the *son of Jupiter*, (says this author), because that god was reckoned by the ancients the author of the world. His mother was called *Latona*, a name which signifies *hidden*; because, before the sun was created, all things were wrapped up in the obscurity of chaos. He is always represented as beardless and youthful, because the sun never grows old or decays. And what else can his bow and arrows imply, but his piercing beams?" And adds, "that all the ceremonies which were performed to his honour, had a manifest relation to the great source of light, which he represented. Whence (he concludes) it is in vain to seek for any other divinity than the sun, which was adored under the name of Apollo."

However, though this is in general true, yet it does appear, from many passages in ancient authors, that there was some illitigious personage named *Apollo*, who, after his apotheosis, was taken for the sun; as Osiris and Orus in Egypt, whose existence cannot be called in question, were, after their death, confounded with the sun, of which they became the symbols, either from the glory and splendor of their reigns, or from a belief that their souls had taken up their residence in that luminary.

Of the four Apollo's mentioned by Cicero, it appears that the three last were Greeks, and the first an Egyptian; who, according to Herodotus, was the son of Osiris and Isis, and called *Orus*. Pausanias is of the same opinion as Herodotus, and ranks Apollo among the Egyptian divinities. The testimony of Diodorus Siculus is still more express; for in speaking of Isis, after saying that she had invented the practice of medicine, he adds, that she taught this art to her son Orus, named *Apollo*, who was the last of the gods that reigned in Egypt.

It is easy to trace almost all the Grecian fables and mythologies from Egypt. If the Apollo of the Greeks was said to be the son of Jupiter, it was because Orus the Apollo of the Egyptians had Osiris for his father, whom the Greeks confounded with Jupiter. If the Greek Apollo was reckoned the god of eloquence, music, medicine, and poetry, the reason was, that Osiris, who was the symbol of the sun among the Egyptians, as well as his son Orus, had there taught those liberal arts. If the Greek Apollo was the god and conductor of the muses, it was because Osiris carried with him in his expedition to the Indies singing women and musicians. This parallel might be carried on still further; but enough has been said to prove that the true Apollo was that of Egypt.

To the other perfections of this divinity the poets have added beauty, grace, and the art of captivating the

Apollo.

Apollo.

the ear and the heart, no less by the sweetness of his eloquence, than by the melodious sounds of his lyre. However, with all these accomplishments, he had not the talent of captivating the fair, with whose charms he was enamoured. But the amours and other adventures related of this god during his residence on earth, are too numerous, and too well known, to be inserted here. His musical contests, however, being more connected with the nature of this work, must not be wholly unnoticed.

To begin, therefore, with the dispute which he had with Pan, that was left to the arbitration of Midas.

Pan, who thought he excelled in playing the flute, offered to prove that it was an instrument superior to the lyre of Apollo. The challenge was accepted; and Midas, who was appointed the umpire in this contest, deciding in favour of Pan, was rewarded by Apollo, according to the poets, with the ears of an ass, for his stupidity.—This fiction seems founded upon history. Midas, according to Pausanias, was the son of Gordius and Cybele; and reigned in the Greater Phrygia, as we learn from Strabo. He was possessed of such great riches, and such an inordinate desire of increasing them by the most contemptible parsimony, that, according to the poets, he converted whatever he touched into gold. However, his talent for accumulation did not extend to the acquirement of taste and knowledge in the fine arts; and, perhaps, his dulness and inattention to these provoked some musical poet to invent the fable of his decision in favour of Pan against Apollo. The scholiast upon Aristophanes, to explain the fiction of his long ears, says, that it was designed to intimate that he kept spies in all parts of his dominions.

See the article Mar-
tyris.

Mariyas, another player on the flute, was still more unfortunate than either Pan or his admirer Midas. This Mariyas *, having engaged in a musical dispute with Apollo, chose the people of Nysa for judges. Apollo played at first a simple air upon his instrument; but Mariyas, taking up his pipe, struck the audience so much by the novelty of its tone, and the art of his performance, that he seemed to be heard with more pleasure than his rival. Having agreed upon a second trial of skill, it is said that the performance of Apollo, by accompanying the lyre with his voice, was allowed greatly to excel that of Mariyas upon the flute alone. Mariyas, with indignation, protested against the decision of his judges; urging that he had not been fairly vanquished according to the rules stipulated, because the dispute was concerning the excellence of their several instruments, not their voices; and that it was wholly unjust to employ two arts against one.

Apollo denied that he had taken any unfair advantage of his antagonists, since Mariyas had employed both his mouth and fingers in performing upon his instrument; so that, if he was denied the use of his mouth, he would be still more disqualified for the contention. The judges approv'd of Apollo's reasoning, and ordered a third trial. Mariyas was again vanquished; and Apollo, inflamed by the violence of the dispute, slew'd him alive for his presumption.

Pausanias relates a circumstance concerning this contest, that had been omitted by Diodorus, which is, that Apollo accepted the challenge from Mariyas, upon condition that the victor should use the vanquished as he pleased.

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Diodorus informs us, that Apollo, soon repenting of the cruelty with which he had treated Mariyas, broke the strings of the lyre, and by that means put a stop, for a time, to any further progress in the practice of that new instrument.

The next incident to be mentioned in the history of Apollo is his defeat of the serpent Python.

The waters of Deucalion's deluge, says Ovid, which had overflowed the earth, left a slime, from whence sprung innumerable monsters; and among others the serpent Python, which made great havoc in the country about Parnassus. Apollo, armed with his darts, put him to death; which, physically explained, implies, that the heat of the sun having dissipated the noxious steams, those monsters soon disappeared; or, if this fable be referred to history, the serpent was a robber, who haunting the country about Delphos, and very much infesting those who came thither to sacrifice; a prince, who bore the name of Apollo, or one of the priests of that god, put him to death.

This event gave rise to the institution of the Pythian games, so frequently mentioned in the Grecian history; and it was from the legend of Apollo's victory over the Python that the god himself acquired the name of *Pythius*, and his priests that of *Pythia* *. The city of Delphos, where the famous oracles were so long delivered, was likewise frequently styled *Pytho*.

* See the article *Pythia*.

As Apollo was the god of the fine arts, those who cultivated them were called *his sons*. Of this number was Philammon of Delphos, whom the poets and mythologists make the twin-brother of Autolychus, by the nymph Chione, and Apollo and Mercury. It is pretended that both these divinities were favoured by the nymph on the same day, and that their fires were known from their different talents. Philammon, a great poet and musician, was reported to be the offspring of the god who presides over those arts; and Autolychus, from the craftiness and subtlety of his disposition, was said to have sprung from Mercury, god of theft and fraud. Philammon is one of the first, after Apollo, upon fabulous record, as a vocal performer, who accompanied himself with the sound of the lyre: his son was the celebrated Thamyris *.

* See Thamyris.

There can be no doubt but that Apollo was more generally revered in the Pagan world than any other deity; having, in almost every region of it, temples, oracles, and festivals, as innumerable as his attributes: the wolf and hawk were consecrated to him, as symbols of his piercing eyes; the crow and the raven, because these birds were supposed to have by instinct the faculty of prediction; the laurel, from a persuasion that those who slept with some branches of that tree under their heads received certain vapours, which enabled them to prophesy. The cock was consecrated to him, because by his crowing he announces the rising of the sun; and the grasshopper on account of his singing faculty, which was supposed to do honour to the god of music. Most of the ancient poets have celebrated this tuneful insect, but none better than Anacreon, Ode 43.

Plato says that the grasshopper sings all summer without food, like those men who, dedicating themselves to the muses, forget the common concerns of life.

The swan was regarded by the ancients as a bird sacred to Apollo in two capacities; first, as being, like the crow and raven, gifted with the spirit of prediction;

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and

Apollo.

and, secondly, for his extraordinary vocal powers. The sweetness of his song, especially at the approach of death, was not only extolled by all the poets of antiquity, but by historians, philosophers, and sages; and to call a great writer the *swan* of his age and nation, was a full acknowledgement of his sovereignty *. Thus Horace calls Pindar the *Theban swan*.

* See the article *Ans.*

Plutarch, who was himself a priest of Apollo, impressed with the highest respect and veneration for him and for music, in his dialogue upon that art, makes one of his interlocutors say, that an invention so useful and charming could never have been the work of man, but must have originated from some god, such as Apollo, the inventor of the flute and lyre, improperly attributed to Hyagnis, Marfyas, Olympus, and others; and the proofs he urges in support of this assertion, shew, if not its truth, at least that it was the common and received opinion.

All dances and sacrifices, says he, used in honour of Apollo, are performed to the sound of flutes: the statue of this god at Delos, erected in the time of Hercules, had in its right-hand a bow; and on the left stood the three graces, who were furnished with three kinds of instruments; the lyre, the flute, and the syrinx. The youth also, who carries the laurel of Tempe to Delphos, is accompanied by one playing on the flute; and the sacred presents formerly sent to Delos by the Hyperboreans, were conducted thither to the sound of lyres, flutes, and shepherd's pipes. He supports these facts by the testimonies of the poets Alcæus, Alceon, and Corinna.

It seems as if the account of Apollo could not be concluded by any thing that is left to offer on the subject, so properly, as by part of the celebrated hymn of Callimachus, which during many ages was performed and heard by the most polished people on the globe, with the utmost religious zeal, at the festivals instituted to this god.

Hah! how the laurel, great APOLLO's tree,
And all the cavern, shakes! Far off, far off,
The man that is unhallow'd: for the god
Approaches. Hark! he knocks: the gates
Feel the glad impulse; and the fever'd bars
Submissive clink against his brazen portals.
Why do the Delian palms incline their boughs,
Self-mov'd; and how'ring swans, their throats relax'd
From native silence, carol sounds harmonious?

Begin, young men, the hymn: let all your harps
Break their inglorious silence; and the dance,
In mystic numbers trod, explain the music.
But first by ardent pray'r, and clear lustration,
Purge the contagious spots of human weakness:
Impure no mortal can behold Apollo.
So may you flourish, favour'd by the god,
In youth with happy nuptials, and in age
With silver hairs, and fair descent of children;
So lay foundations for aspiring cities,
And bless your spreading colonies' increase.

Pay sacred reverence to Apollo's fong;
Left watchful the far-shooting god emit
His fatal arrows. Silent, Nature stands;
And seas subside, obedient to the sound
Of lo! lo Pæan! nor dares Theseis
Longer bewail her lov'd Achilles' death;
For Phœbus was his foe. Nor must dead Niobe
In fruitless sorrow persevere, or weep
Even thro' the Phrygian marble. Hapless mother!
Whose fondness could compare her mortal offspring
To those which fair Letœna bore to Jove.
Lo! again repeat ye, lo! Pæan!

Recite Apollo's praise till night draws on,
The ditty still unfinish'd; and the day
Unequal to the godhead's attributes

Various, and matter copious of your songs,
Sublime at Jove's right-hand Apollo sits,
And thence distributes honour, gracious king,
And theme of verse perpetual. From his robe
Flows light ineffable his harp, his quiver,
And Lætiæ bare, are gold: with golden sandals
His feet are shod. How rich! how beautiful!
Beneath his steps the yellow min'ral rises;
And earth reveals her treasures. Youth and beauty
Eternal deck his cheek: from his fair head
Perfumes distil their sweets; and cheerful Health,
His duteous hand-maid, through the air improv'd
With lavish hand diffuses scents ambrosial,
The spearman's arm by thee, great god, directed,
Sends forth a certain wound. The laurel'd bard
Inspir'd by thee, composes verse immortal.
Taught by thy art divine, the sage physician
Eludes the urn, and chains or exiles death.

Perpetual fires shine hallow'd on thy altars,
When annual the Caræan feast is held:
The wallike Libyans, clad in armour, lead
The dance, with clanging swords and shields they beat.
The dreadful measure: in the chorus join
Their women, brown but beautiful; such rites
To thee well pleasing.

The monstrous Python
Durst tempt thy wrath in vain; for dead he fell,
To thy great strength and golden arms unequal.

Lo! while thy unerring hand eland
Another and another darts, the people
Joyfully repeated *lo! lo Pæan!*
Elate the dart, Apollo: for the safety
And health of man, gracious thy mother bore thee!

PÆIOR.

APOLLODORUS, born at Damascus, a famous architect under Trajan and Hadrian: he had the direction of the bridge of stone which Trajan ordered to be built over the Danube in the year 104, which was esteemed the most magnificent of all the works of that emperor. Hadrian, one day as Trajan was discoursing with this architect upon the buildings he had raised at Rome, would needs give his judgment, and shewed he understood nothing of the matter. Apollodorus turned upon him bluntly, and said to him, Go paint citruls, for you are very ignorant of the subject we are talking upon. Hadrian at this time boasted of his painting citruls well. This insult cost Apollodorus his life.

APOLLODORUS, a celebrated painter of Athens, about 408 years before the birth of Christ, was the first who invented the art of mingling the colours, and of expressing the lights and shadows. He was admired also for his judicious choice of subjects, and for the beauty and strength of colouring surpass'd all the masters that went before him. He excelled likewise in statuary.

APOLLOBORUS the Athenian, a famous grammarian, the son of Asclepiades and disciple of Aristarchus. He wrote many works not now extant; but his most famous production was his *Bibliotheca*, concerning the origin of the gods: this work consisted of 24 books, but only three are now in being. Several other pieces of his are to be found in Fabricius's *Bibliotheca Græca*. There were various other persons of this name: Scipio Testi, a Neapolitan, has written a treatise of the Apollodoruses, which was printed at Rome in 1555; and Dr Thomas Gale published a work of the same kind in 1675.

APOLLONIA, the name of several ancient cities, parti-

Apollo
Apollonia.

Apollonia

Apollonius.

particularly of a colony of the Milesians in Thrace, from which Lucullus took away a colossus of Apollo, and placed it in the capital. The greatest part of the town was situated in a small island on the Euxine, in which was a temple of Apollo, (Strabo). Pliny says the colossus was 30 cubits high, and cost 500 talents. There was also an Apollonia at mount Parnassus, near Delphi, (Stephanus). Troezen was formerly called *Apollonia*.

APOLLONIA, feasts sacred to Apollo, instituted upon the following occasion. Apollo, having vanquished Python, went with his sister Diana to *Ægialeæ*; but, being driven from thence, he removed to the island Crete. The *Ægialeans* were soon after visited with a plague; upon which, consulting the soothsayers, they were ordered to send seven young men, and as many virgins, to appease those deities and bring them back into their country. Apollo and Diana being thus appeased, returned to *Ægialeæ*: in memory of which, they dedicated a temple to Pitho, the *goddess of persuasion*; whence a custom arose of chuling every year seven young men, and as many virgins, to go as it were in search of Apollo and Diana.

APOLLONIA, in geography, a promontory of Africa, upon the coast of Guinea, near the mouth of the river Mancu.

APOLLONIUS, the author of the *Argonautics*, was born at Alexandria in Egypt: he taught rhetoric at Rhodes, and hence was called *Rhodius*. He flourished about the 137th Olympiad, and was keeper of the Alexandrian library. Longinus, in his treatise *Of the Sublime*, commends this poet. The ancient Scholia upon his *Argonautics*, still extant, are extremely useful, and full of learning.

APOLLONIUS of Perga, a city of Pamphylia, was a great geometrician, under the reign of Ptolemy Euergetes, which reaches from the 2^d year of the 133^d Olympiad to the 3^d year of the 139th. He studied a long time at Alexandria, under the disciples of Euclid; and composed several works, of which that only of the Conics remains.

APOLLONIUS, a Pythagorean philosopher, born at Tyana in Cappadocia, about the beginning of the first century. At 16 years of age he became a strict observer of Pythagoras's rules, renouncing wine, women, and all sorts of flesh; not wearing shoes, letting his hair grow, and wearing nothing but linen. He soon after set up for a reformer of mankind, and chose his habitation in a temple of *Æsculapius*, where he is said to have performed many wonderful cures. Philostratus has wrote the Life of Apollonius, in which there are numberless fabulous stories recounted of him. We are told that he went five years without speaking; and yet, during this time, that he stopped many seditions in Cilicia and Pamphylia: that he travelled, and set up for a legislator; and that he gave out he understood all languages, without having ever learned them; that he could tell the thoughts of men, and understood the oracles which birds gave by their singing. The heathens were fond of opposing the pretended miracles of this man to those of our Saviour: and by a treatise which Eusebius wrote against one Hierocles, we find that the drift of the latter, in the treatise which Eusebius refutes, seems to have been to draw a parallel betwixt Jesus Christ and Apollonius, in which he gives the preference to this philosopher. Mr. Du Pin has

wrote a confutation of Philostratus's Life of Apollonius.

Apologue

Apono.

Apollonius wrote some works, viz. four books of judicial astrology; a treatise upon the sacrifices, shewing what was proper to be offered to each deity; and a great number of letters, all of which are now lost.

APOLOGUE, in matters of literature, an ingenious method of conveying instruction by means of a feigned relation called a *moral fable*.

The only difference between a parable and an apologue is, that the former, being drawn from what passes among mankind, requires probability in the narration; whereas the apologue, being taken from the supposed actions of brutes, or even of things inanimate, is not tied down to the strict rules of probability. *Æsop's* fables are a model of this kind of writing.

APOLOGY, a Greek term, literally importing an excuse or defence of some person or action.

APOMELL, among ancient physicians, a decoction of honey and vinegar, much used as a detergent, promoter of stool, urine, &c.

APONEUROSIS, among physicians, a term sometimes used to denote the expansion of a nerve or tendon in the manner of a membrane; sometimes for the cutting off a nerve; and, finally, for the tendon itself.

APONO (Peter d'), one of the most famous philosophers and physicians of his age, born in the year 1250, in a village about four miles from Padua. He studied some time at Paris, and was there promoted to the degree of doctor in philosophy and physic. When he came to practise as a physician, he is said to have insisted on very large sums for his visits: we are not told what he demanded for the visits he made in the place of his residence; but it is affirmed, that he would not attend the sick in any other place under 150 florins a-day; and when he was sent for by pope Honorius IV. he demanded 400 ducats for each day's attendance. He was suspected of magic, and prosecuted by the inquisition on that account. "The common opinion of almost all authors (says Naude) is, that he was the greatest magician of his age; that he had acquired the knowledge of the seven liberal arts, by means of the seven familiar spirits, which he kept inclosed in a crystal; and that he had the dexterity to make the money he had spent, come back into his purse." The same author adds, that he died before the process against him was finished, being then in the 80th year of his age; and that, after his death, they ordered him to be burnt in effigy, in the public place of the city of Padua; designing thereby to strike a fear into others, of incurring the like punishment; and to suppress the reading three books which he had wrote; the first being the *Heptameron*, which is printed at the end of the first volume of Agrippa's work; the second, that which is called by Trithemius, *Elucidarium necromanticum Petri de Albano*; and the last, that which is intitled by the same author, *Liber experimentorum mirabilium de annulis secundum xxviii. mansiones lune*. His body being secretly taken up by his friends, escaped the vigilance of the inquisitors, who would have burnt it. It was removed several times, and was at last placed in the church of St Augustin, without an epitaph or any mark of honour. The most remarkable book which Apono wrote, was that which procured

Aponoge-
ion
||
Aposiopesis.

him the surname of *Conciliator*; he wrote also a piece intitled *De medicina omnimoda*. There is a story told of him, that, having no well in his house, he caused his neighbour's to be carried into the street by devils, when he heard they had forbidden his maid fetching water there. He had much better (says Mr Bayle) have employed the devils to make a well in his own house, and have stopped up his neighbour's; or, at least, transported it into his house, rather than into the street.

APONOGETON, in botany. See ZANNICHELLIA.

APONUS, a hamlet near Patavium, with warm baths. It was the birth-place of Livy, (Martial); and is now called *Albano*. E. Long. 10. Lat. 45. 15.

APOPEMPTIC, in the ancient poetry, a hymn addressed to a stranger on his departure from a place to his own country. The ancients had certain holidays, wherein they took leave of the gods with *apopemptic* songs, as supposing them returning each to his own country. The deities having the patronage of divers places, it was but just to divide their preference, and allow some time to each. Hence it was, that among the Delians and Milesians we find feasts of Apollo, and among the Argians feasts of Diana, called *Epidemie*, as supposing these deities then more peculiarly resident among them. On the last day of the feast they dismissed them, following them to the altars with *apopemptic* hymns.

AOPHAPHIS, a figure in rhetoric, by which the orator, speaking ironically, seems to wave what he would plainly insinuate: as, *Neither will I mention those things, which if I should, you notwithstanding could neither confute nor speak against them.*

AOPHLEGMATIZANTS, in pharmacy, medicines proper to clear the head from superfluous phlegm, whether by spitting, or by the nose.

AOPHTHEGM, a short, sententious, and instructive remark, pronounced by a person of distinguished character. Such are the apophthegms of Plutarch, and those of the ancients collected by Lycobithenes.

AOPHYGE, in architecture, a concave part or ring of a column, lying above or below the flat member. The French call it *le conge d'en bas*, or *d'en haut*; the Italians, *cavo di basso*, or *di sopra*; and also, *il vivo di basso*. The apophyge originally was no more than the ring, or ferril, at first fixed on the extremities of wooden pillars, to keep them from splitting; which afterwards was imitated in stone.

AOPHYSIS, in anatomy, a process or protuberance of a bone. See ANATOMY, Chap. I. c.

AOPPLEXY, a distemper in which the patient is suddenly deprived of all his senses, and of voluntary motion. See the Index subjoined to MEDICINE.

APORIA, is a figure in rhetoric, by which the speaker shews, that he doubts where to begin for the multitude of matter, or what to say in some strange and ambiguous thing; and doth, as it were, argue the case with himself. Thus Cicero says, *Whether he took them from his fellows more impudently, gave them to a barlot more lasciviously, removed them from the Roman people more wickedly, or altered them more presumptuously, I cannot well declare.*

APOSIOPESIS, a form of speech, by which the speaker, through some affection, as sorrow, bashfulness,

fear, anger, or vehemence, breaks off his speech before it be all ended. A figure, when, speaking of a thing, we yet seem to conceal it, though indeed we aggravate it: or when the course of the sentence begun is so stayed, as thereby some part of the sentence, not being uttered, may be understood; as, *I might say much more, but modestly commands silence.*

APOSTACY, the abandoning the true religion. The primitive Christian church distinguished several kinds of apostacy. The first, of those who went over entirely from Christianity to Judaism; the second, of those who mingled Judaism and Christianity together; and the third, of those who complied so far with the Jews as to communicate with them in many of their unlawful practices, without making a formal profession of their religion. But the fourth sort of those who, after having been some time Christians, voluntarily relapsed into Paganism.

The perversion of a Christian to Judaism, Paganism, or other false religion, was punished by the emperors Constantius and Julian with confiscation of goods; to which the emperors Theodosius and Valentinian added capital punishment, in case the apostate endeavoured to pervert others to the same iniquity. A punishment too severe for any temporal laws to inflict: and yet the zeal of our ancestors imported it into this country; for we find by Bracton, that in his time apostates were to be burnt to death. Doubtless the preservation of Christianity, as a national religion, is, abstracted from its own intrinsic truth, of the utmost consequence to the civil state: which a single instance will sufficiently demonstrate. The belief of a future state of rewards and punishments, the entertaining just ideas of the moral attributes of the supreme Being, and a firm persuasion that he superintends and will finally compensate every action in human life (all which are clearly revealed in the doctrines, and forcibly inculcated by the precepts, of our saviour Christ), these are the grand foundation of all judicial oaths; which call God to witness the truth of those facts, which perhaps may be only known to him and the party attesting: all moral evidence therefore, all confidence in human veracity, must be weakened by apostacy, and overthrown by total infidelity. Wherefore all affronts to Christianity, or endeavours to depreciate its efficacy, in those who have once professed it, are highly deserving of censure. But yet the loss of life is a heavier penalty than the offence, taken in a civil light, deserves; and, taken in a spiritual light, our laws have no jurisdiction over it. This punishment, therefore, has long ago become obsolete; and the offence of apostacy was for a long time the object only of the ecclesiastical courts, which corrected the offender *pro salute anime*. But about the close of the last century, the civil liberties to which we were then restored being used as a cloak of maliciousness, and the most horrid doctrines subversive of all religion being publicly avowed both in discourse and writings, it was thought necessary again for the civil power to interpose, by not admitting those miscreants to the privileges of society, who maintained such principles as destroyed all moral obligation. To this end it was enacted by statute 9 & 10 W. III. c. 32. That if any person educated in, or having made profession of, the Christian religion, shall by writing, printing, teaching, or advised speaking, deny the Christian religion to be true,

Apostacy.

or the holy Scriptures to be of divine authority, he shall upon the first offence be rendered incapable to hold any office or place of trust; and, for the second, be rendered incapable of bringing any action, or of being guardian, executor, legatee, or purchaser of lands, and shall suffer three years imprisonment without bail. To give room however for repentance, if, within four months after the first conviction, the delinquent will in open court publicly renounce his error, he is discharged for that once from all disabilities.

APOSTASIS, in medicine, the fame with abscess.

APOSTATE, one who deserts his religion. Among the Romanists, it signifies a man who, without a legal dispensation, forakes a religious order of which he had made profession. Hence,

APOSTATA CAPIENDO, in the English law, a writ that formerly lay against a person who, having entered into some order of religion, broke out again, and wandered up and down the country.

A POSTERIORI, or demonstration *à posteriori*. See **DEMONSTRATION**.

APOSTIL, in matters of literature, the same with a marginal note.

APOSTLE properly signifies a messenger or person sent by another upon some business; and hence, by way of eminence, denotes one of the disciples commissioned by Jesus Christ to preach the gospel.

Our blessed Lord selected twelve out of the number of his disciples to be invested with the apostleship. Their names were Simon Peter, Andrew, James the greater, John, Philip, Bartholomew, Thomas, Matthew, James the less, Jude surnamed Lebbeus or Thaddeus, Simon the Canaanite, and Judas Iscariot. Of these Simon, Andrew, James the greater, and John, were fishermen; and Matthew a publican, or receiver of the public revenues: of what profession the rest were, we are not told in Scripture; though it is probable they were fishermen.

There are various conjectures as to the reason of our Saviour's making choice of *twelve* apostles. The most probable is, that it might be in allusion to the twelve patriarchs, as the founders of their several tribes; or to the twelve chief heads or rulers of those tribes, of which the body of the Jewish nation consisted. This opinion seems to be countenanced by what our Saviour tells his apostles, that, "when the Son of man shall sit in the throne of his glory, *they* also shall sit upon twelve thrones judging the twelve tribes of Israel."

Our Lord's first commission to his apostles was in the third year of his public ministry, about eight months after their solemn election; at which time he sent them out by two and two. They were to make no provision of money for their subsistence in their journey, but to expect it from those to whom they preached. They were to declare, that the kingdom of heaven, or the Messiah, was at hand; and to confirm their doctrine by miracles. They were to avoid going either to the Gentiles or to the Samaritans, and to confine their preaching to the people of Israel. In obedience to their Master, the apostles went into all the parts of Palestine inhabited by the Jews, preaching the gospel, and working miracles. The evangelical history is silent as to the particular circumstances attending this first preaching of the apostles; and only informs us, that they returned, and told their Master of all that

they had done.

Their second commission, just before our Lord's ascension into heaven, was of a more extensive and particular nature. They were now not to confine their preaching to the Jews, but to "go and teach **ALL** nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghost." Accordingly they began publicly, after our Lord's ascension, to exercise the office of their ministry, working miracles daily in proof of their mission, and making great numbers of converts to the Christian faith. This alarmed the Jewish Sanhedrim; whereupon the apostles were apprehended, and, being examined before the high-priest and elders, were commanded not to preach any more in the name of Christ. But this injunction did not terrify them from persisting in the duty of their calling; for they continued daily, in the temple, and in private houses, teaching and preaching the gospel.

After the apostles had exercised their ministry for twelve years in Palestine, they resolved to disperse themselves in different parts of the world, and agreed to determine by lot what parts each should take. According to this division, St Peter went into Pontus, Galatia, and those other provinces of the Lesser Asia. St Andrew had the vast northern countries of Scythia and Sogdiana allotted to his portion. St John's was partly the same with Peter's, namely the Lesser Asia. St Philip had the Upper Asia assigned to him, with some parts of Scythia and Colchia. Arabia Felix fell to St Bartholomew's share. St Matthew preached in Chaldaea, Persia, and Parthia. St Thomas preached likewise in Parthia; as also to the Hyrcanians, Bactrians, and Indians. St James the Less continued in Jerusalem, of which church he was bishop. St Simon had for his portion Egypt, Cyrene, Libya, and Mauritania; St Jude Syria and Mesopotamia; and St Matthias, who was chosen in the room of the traitor Judas, Cappadocia and Colchia. Thus, by the dispersion of the apostles, Christianity was very early planted in a great many parts of the world. We have but very short and imperfect accounts of their travels and actions.

In order to qualify the apostles for the arduous task of converting the world to the Christian religion, they were, in the first place, miraculously enabled to speak the languages of the several nations to whom they were to preach; and, in the second place, were endowed with the power of working miracles, in confirmation of the doctrines they taught; gifts which were unnecessary, and therefore ceased, in the after ages of the church, when Christianity came to be established by the civil power.

The several apostles are usually represented with their respective badges or attributes; St Peter with the keys; St Paul with a sword; St Andrew with a cross; St James the Less with a fuller's pale; St John with a cup, and a winged serpent flying out of it; St Bartholomew with a knife; St Philip with a long staff, whose upper end is formed into a cross; St Thomas with a lance; St Matthew with a hatchet; St Matthias with a battle-axe; St James the Greater with a pilgrim's staff, and a gourd-bottle; St Simon with a saw; and St Jude with a club.

The Jews also had their *apostles*, by which they meant officers, sent into several parts, by way of visitors or commissaries, to receive the money collected for the

Apostles
creed.

the reparation of the temple, and the tribute payable to the Romans. The name was likewise given, in the primitive church, to bishops; and a bishop's fee was called *apostolica sedes*.

APOSTLES Creed: A formula, or summary, of the Christian faith, drawn up, according to Rufinus, by the apostles themselves; who, during their stay at Jerusalem, soon after our Lord's ascension, agreed upon this creed, as a rule of faith, and as a word of distinction by which they were to know friends from foes. Baronius, and some other authors, conjecture, that they did not compose it till the second year of the reign of Claudius, a little before their dispersion. As to their manner of composing it, some fancy, that each apostle pronounced his article, which is the reason of its being called *symbolum apostolicum*, it being made up of sentences jointly contributed, after the manner of persons paying each their club (*symbolum*) or share of a reckoning.

But there are reasons which may induce us to question whether the apostles composed any such creed as this. For, first, neither St Luke in the Acts, nor any other ecclesiastical writer before the 5th century, make any mention of an assembly of the apostles in order to the composing of a creed. Secondly, the fathers of the three first centuries, in disputing against the heretics, endeavour to prove that the doctrine contained in this creed was the same which the apostles taught; but they never pretend, that the apostles composed it. Thirdly, if the apostles had made this creed, it would have been the same in all churches, and in all ages; and all authors would have cited it after the same manner. But the case is quite otherwise. In the second and third ages of the church, there were as many creeds as authors, and one and the same author sets down the creed after a different manner in several places of his works; which is an evidence, that there was not at that time any creed which was reputed to be the apostles. In the 4th century, Rufinus compares together the three ancient creeds of the churches of Aquileia, Rome, and the East, which differ very considerably in the terms. Besides, these creeds differed not only in the terms and expressions, but even in the articles, some of which were omitted in one or other of them, such as those of the *descent into hell*, the *communion of the saints*, and the *life everlasting*. From these reasons it may be gathered, that tho' this creed may be said to be that of the apostles in regard to the doctrines contained therein, yet it is not to be referred to them as the authors and first composers of it. Who was the true author of it, is not so easy to determine; tho' its great antiquity may be inferred from hence, that the whole form, as it now stands in the English liturgy, is to be found in the works of St Ambrose and Rufinus, the former of whom flourished in the 3rd century, and latter in the 4th century.

The primitive Christians, in regard they always concealed this and their other mysteries, did not publicly recite the creed, except at the times of baptism; which, unless in cases of necessity, were only at Easter and Whitfuntide. The constant repeating it was not introduced into the church till the end of the 5th century; about which time Petrus Gnapheus, bishop of Antioch, prescribed the recital of it every time divine service was performed.

APOSTOLICAL, an epithet, or name, given to things that have a relation to the apostles; as *apostolical age*, *apostolical doctrine*, &c. The Romanists call their church, by way of eminence, *catholic* and *apostolical*. In the primitive times, the appellation was given to such churches as had been founded by the apostles themselves; of which the four principal were those of Rome, Alexandria, Antioch, and Jerusalem. In progress of time, the bishop of Rome growing in power above the rest, and the three patriarchates of Alexandria, Antioch, and Jerusalem, falling into the hands of the Saracens, the title *apostolical* became restrained to the Pope and see of Rome. Hence we meet with *apostolical see*, *apostolical nuncio*, *apostolical notary*, *apostolical brief*, *apostolical chamber*, &c.

APOSTOLICAL Canons, rules, or laws, for the government of the Christian church, supposed by some to have been drawn up by the apostles themselves. Baronius and Bellarmin rejected the last 35 as apocryphal, but admitted the first 50 as genuine. Dr Beveridge is of opinion, with others, that, though these canons were not written by the apostles, yet that they were very ancient, and were properly a collection of the canons of several councils held before that of Nice.

Indeed, that the *apostolical canons* are of great antiquity, is plain from hence, that the council of Nice frequently cites them under the names of *ancient laws*, *canons of the fathers*, *ecclesiastical* and even *apostolical canons*. We cannot certainly say when, or by whom, they were compiled. However, it is very probable the collection was made at different times, because there is no connection or order observed in them. The Greek church always acknowledged them as of great authority. They are cited by Justinian in his sixth novel.

APOSTOLICS, an early sect of Christians, who called themselves so, upon a pretence of being the only men who led their lives in imitation and after the example of the apostles: they likewise called themselves *apostolics*, from a shew of renouncing the world more than other men. They condemned marriage.

APOSTROPHE, in rhetoric, a figure by which the orator, in a vehement commotion, turns himself on all sides, and applies to the living and dead, to angels and to men, to rocks, groves, &c. Thus Adam, in Milton's Paradise Lost:

O Woods, O fountains, hillocks, dales, and bowers,
With other echo, &c.

APOSTROPHE, in grammar, the contraction of a word by the use of a comma: as *call'd* for *called*, *tho'* for *though*.

APOTECHEISMUS, in the ancient military art, a kind of line of circumvallation drawn round a place in order to besiege it. The first thing the ancients went about, when they designed to lay close siege to a place, was the Apotechismus; which sometimes consisted of a double wall, or rampart, raised of earth; the innermost to prevent sudden sallies from the town, the outermost to keep off foreign enemies from coming to the relief of the besieged. This answered to what is called *lines of contravallation and circumvallation* among the moderns.

APOTACTITES, in church history, a name given to the Apostolics, from the shew they made of renouncing the world more than other men.*

Apostolical
||
Apostolites.

* See *Apote-*
lit.

APO.

Apothecary
||
Apparent.

Apparent
||
Appel.

APOTHECARY, one who practises the art of pharmacy. In London, the apothecaries are one of the city-companies. They were incorporated by a charter from king James I. procured at the solicitation of Dr Mayerne and Dr Aitkins: till that time they only made a part of the grocers company; plums, sugar, spice, Venice treacle, mithridate, &c. were sold in the same shop and by the same person. The reason of separating them was, that medicines might be better prepared, and in opposition to divers persons who imposed unwholesome remedies on the people. By an act which was made perpetual in the ninth year of George I. they are exempted from serving upon juries, or in ward and parish offices. They are obliged to make up their medicines according to the formulas prescribed in the college dispensatory; and are liable to have their shops visited by the censors of the college, who are empowered to destroy such medicines as they think not good.

APOTHEOSIS, in antiquity, a ceremony by which the ancient Romans complimented their emperors and great men, after their death, with a place among the gods. It is described as follows. After the body of the deceased had been burnt with the usual solemnities, an image of wax, exactly resembling him, was placed on an ivory couch, where it lay for seven days, attended by the senate and ladies of the highest quality in mourning; and then the young senators and knights bore the bed of state through the *via sacra* to the old forum, and from thence to the *campus martius*, where it was deposited upon an edifice built in form of a pyramid. The bed being thus placed amidst a quantity of spices and other combustibles, and the knights having made a solemn procession round the pile, the new emperor, with a torch in his hand, set fire to it, whilst an eagle, let fly from the top of the building, and mounting in the air with a firebrand, was supposed to convey the soul of the deceased to heaven; and thenceforward he was ranked among the gods.

We often meet with the consecration or Apotheosis of emperors represented on medals; where we see the pyramids of several stories, each growing less and less, we see also the eagles flying away with the souls of the deceased emperors. A gem in the museum of Brandenburg, represents the apotheosis of Julius Cæsar, mounted upon the celestial globe, and holding an helm in his hand, as if he were now the governor of Heaven, as before of the earth. See **DEIFICATION**.

APOTOME, in geometry, the difference between two incommensurable lines.

APOTOME, in music, the difference between a greater and lesser semi-tone; expressed by the ratio, 128; 125.

* See Decoction.

APOZEM, in medicine, the same with decoction*. **APPARATUS**, a term used to denote a complete set of instruments, or other utensils, belonging to any artist or machine.

APPARENT, in a general sense, something that is visible to the eyes, or obvious to the understanding.

APPARENT, among mathematicians and astronomers, denotes things as they appear to us, in contradistinction from real or true; thus we say, the apparent diameter, distance, magnitude, place, figure, &c. of bodies.

APPARENT HEIR, in law. No inheritance can vest, nor can any person be the actual complete heir of another,

till the ancestor is previously dead. *Nemo est heres viventis*. Before that time the person who is next in the line of succession is called an *heir apparent*, or *heir presumptive*. *Heirs apparent* are such, whose right of inheritance is indefeasible, provided they outlive the ancestor; as the eldest son or his issue, who must by the course of the common law be heirs to the father whenever he happens to die. *Heirs presumptive* are such, who, if the ancestor should die immediately, would in the present circumstances of things be his heirs: but whose right of inheritance may be defeated by the contingency of some nearer heir being born; as a brother or nephew, whose presumptive succession may be destroyed by the birth of a child; or daughter, whose present hopes may be hereafter cut off by the birth of a son. Nay, even if the estate hath descended, by the death of the owner, to such brother, or nephew, or daughter; in the former cases, the estate shall be divested and taken away by the birth of a posthumous child; and, in the latter, it shall also be totally divested by the birth of a posthumous son.

APPARITION, in a general sense, denotes simply the appearance of a thing. In a more limited sense, it is used for a spectre or ghost.—Several instances of apparitions occur in the Bible; that of Samuel, raised by the witch of Endor, has occasioned great disputes. We find great controversies among authors, in relation to the reality, the existence or non-existence, the possibility or impossibility, of apparitions. The Chaldeans, the Jews, and other nations, have been the steady asserters of the belief of apparitions. The denial of spirits and apparitions is by some made one of the marks of infidelity, if not of atheism. Many of the apparitions we are told of in writers, are doubtless mere delusions of the sense; many others were seen but in dreams or deliquiums; many others are fictitious, contrived merely to amuse, or answer some purpose. Apparitions, it is certain, are machines that on occasion have been of good service both to generals, to ministers of state, to priests, and others.

APPARITOR, among the Romans, a general term to comprehend all attendants of judges and magistrates appointed to receive and execute their orders. *Apparitor*, in England, is a messenger that serves the process of a spiritual court, or a beadle in an university who carries the mace.

APPAUMEE, in heraldry, denotes one hand extended, with the full palm appearing, and the thumb and fingers at full length.

APPEAL, in law, the removal of a cause from an inferior to a superior court or judge, when a person thinks himself aggrieved by the sentence of the inferior judge. Appeals lie from all the ordinary courts of justice to the House of Lords. In ecclesiastical cases, if an appeal is brought before a bishop, it may be removed to the archbishop; if before an archdeacon, to the court of arches, and thence to the archbishop; and from the archbishop's court to the king in chancery.

APPEAL, in common law, denotes an accusation by a private subject against another, for some heinous crime; demanding punishment on account of the particular injury suffered, rather than for the offence against the public.

This private process, for the punishment of public crimes, had probably its original in those times, when

Appeal. a private pecuniary satisfaction, called a *weregild*, was constantly paid to the party injured, or his relations, to expiate enormous offences. This was a custom derived to the English, in common with other northern nations, from their ancestors the ancient Germans; among whom, according to Tacitus, *lultur homicidium certo armentorum ac pecorum numero; recipitque satisfactionem universi domus*. In the same manner, by the Irish Brehon law, in case of murder, the brehon or judge was used to compound between the murderer, and the friends of the deceased who prosecuted him, by causing the malefactor to give unto them, or to the child or wife of him that was slain, a recompence which they called an *eriac*. And thus we find in the Anglo-Saxon laws (particularly those of king Athelstan) the several weregilds for homicide established in progressive order, from the death of the poor or peasant, up to that of the king himself. And in the laws of Henry I. we have an account of what other offences were redeemable by weregild, and what were not so. As therefore, during the continuance of this custom, a process was certainly given, for recovering the weregild by the party to whom it was due; it seems, that, when these offences by degrees grew no longer redeemable, the private process was still continued, in order to insure the infliction of punishment upon the offender, though the party injured was allowed no pecuniary compensation for the offence.

But, though appeals were thus in the nature of prosecutions for some atrocious injury committed more immediately against an individual, yet it also was anciently permitted, that any subject might appeal another subject of high-treason, either in the courts of common law, or in parliament, or (for treasons committed beyond the seas) in the court of the high constable and marshal. The cognizance of appeals in the latter still continues in force; and so late as 1631, there was a trial by battle awarded in the court of chivalry, on such an appeal of treason: but that in the first was *virtually* abolished by the statutes 5 Edw. III. c. 9. and 2 Edw. III. c. 24. and in the second *expressly* by statute 1 Hen. IV. c. 14. So that the only appeals now in force, for things done within the realm, are appeals of felony and mayhem.

An appeal of felony may be brought for crimes committed either against the parties themselves, or their relations. The crimes against the parties themselves are *larceny, rape, and arson*. And for these, as well as for mayhem, the persons robbed, ravished, maimed, or whose houses are burnt, may institute this private process. The only crime against one's relation, for which an appeal can be brought, is that of *killing* him, by either murder or manslaughter. But this cannot be brought by every relation; but only by the wife for the death of her husband, or by the heir-male for the death of his ancestor; which heirship was also confined by an ordinance of Henry I. to the four nearest degrees of blood. It is given to the wife, on account of the loss of her husband: therefore, if she marries again, before or pending her appeal, it is lost and gone; or, if she marries after judgment, she shall not demand execution. The heir, as was said, must also be heir-male, and such a one as was the next heir by the course of the common law at the time of the killing of the ancestor. But this rule has three exceptions: 1. If the person killed leaves an innocent wife, she only, and not the

heir, shall have the appeal: 2. If there be no wife, and the heir be accused of the murder, the person, who next to him would have been heir-male, shall bring the appeal: 3. If the wife kills her husband, the heir may appeal her of the death. And, by the statute of Gloucester, 6 Ed. I. c. 9. all appeals of death must be sued within a year and a day after the completion of the felony by the death of the party: which seems to be only declaratory of the old common law; for in the Gothic constitutions we find the same "*præscriptio annalis, quæ currit adversus actorem, si de homicida ei non constat intra annum a cade facta, nec quinquam interea arguat et accuset*."

These appeals may be brought previous to any indictment; and, if the appellee be acquitted thereon, he cannot be afterwards indicted for the same offence. In like manner as by the old Gothic constitution, if any offender gained a verdict in his favour, when prosecuted by the party injured, he was also understood to be acquitted of any crown-prosecution for the same offence: but, on the contrary, if he made his peace with the king, still he might be prosecuted at the suit of the party. And so, in England, if a man be acquitted on an indictment of murder, or found guilty, and pardoned by the king, still he ought not (in strictness) to go at large, but be imprisoned or let to bail till the year and day be past, by virtue of the statute 3 Hen. VII. c. 1. in order to be forthcoming to answer any appeal for the same felony, not having as yet been punished for it: though, if he hath been found guilty of manslaughter on an indictment, and hath had the benefit of clergy, and suffered the judgment of the law, he cannot afterwards be appealed; for it is a maxim in law, "*that nemo bis punitur pro eodem delicto*." Before this statute was made, it was not usual to indict a man for homicide within the time limited for appeals; which produced very great inconvenience.

If the appellee be acquitted, the appellor (by virtue of the statute of Westminster. 2. 13 Edw. I. c. 12.) shall suffer one year's imprisonment, and pay a fine to the king, besides restitution of damages to the party for the imprisonment and infamy which he has sustained; and, if the appellor be incapable to make restitution, his abettors shall do it for him, and also be liable to imprisonment. This provision, as was foreseen by the author of Fleta, proved a great discouragement to appeals; so that thenceforward they ceased to be in common use.

If the appellee be found guilty, he shall suffer the same judgment, as if he had been convicted by indictment: but with this remarkable difference, that on an indictment, which is at the suit of the king, the king may pardon and remit the execution; on an appeal, which is at the suit of a private subject, to make an atonement for the private wrong, the king can no more pardon it, than he can remit the damages recovered on an action of battery. In like manner as, while the weregild continued to be paid as a fine for homicide, it could not be remitted by the king's authority. And the ancient usage was, so late as Henry IV.'s time, that all the relations of the slain should drag the appellee to the place of execution: a custom, founded upon that savage spirit of family-rentment which prevailed universally through Europe after the irruption of the northern nations, and is peculiarly attended to in their several codes of law; and which prevails even now among
the

Appearance the wild and untutored inhabitants of America: as if the finger of nature had pointed it out to mankind, in their rude and uncivilized state. However, the punishment of the offender may be remitted and discharged by the concurrence of all parties interested; and as the king by his pardon may frustrate an indictment, for the appellant by his release may discharge an appeal: "*nam quilibet potest renunciare juri pro se introducto.*"

APPEARANCE, in a general sense, the exterior surface of a thing, or that which immediately strikes the senses.

APPEARANCE, in law, signifies a defendant's filing a common or special bail, on any process issued out of a court of judicature.

APPELLANT, in a general sense, one who appeals. See **APPEAL**.

APPELLANTS, in church history, an appellation given to such of the catholic clergy as appeal from the constitution unigenitus to a general council.

APPELLATIVE. Words and names are either common or proper. Common names are such as stand for universal ideas, or a whole rank of beings, whether general or special. These are called *appellatives*. So fish, bird, man, city, river, are common names; and so are trout, eel, lobster; for they all agree to many individuals, and come to many species.

APPELLEE, among lawyers, the person against whom an appeal is brought. See **APPEAL**.

APPENDIX, in literature, a treatise added at the end of a work, to render it more complete.

APPERCEPTION, or **ADPERCEPTION**, a term used by Leibnitz and his followers for consciousness.

APPETITE, in a general sense, the desire of enjoying some object, supposed to be conducive to our happiness. When this inclination is guided by reason, and proportioned to the intrinsic value of the object, it is called *rational appetite*; as, on the other hand, it is denominated *sensitive appetite*, when we have only a blind propensity to a thing, without determinate ideas of the good qualities for which we desire it.

APPETITE, in medicine, a certain painful or uneasy sensation, always accompanied with a desire to eat or drink.—An excessive appetite is called by physicians *bulimy*, or *fomes canina*; a defect or loss of it, *anorexy*; and that after things improper for food, *pica*.

APPIA VIA, a way reaching from Rome through Capua to Brundisium, between 330 and 350 miles long. Appius Claudius, surnamed *Cecus*, in the year of the city 441, carried it from the Porta Capena to Capua, (Livy, Frontinus). It was afterwards carried on to Brundisium; but by whom, or when, is uncertain. It was laid with very hard stone, brought from a great distance, large, and squared, (Diodorus); and it was so wide, that several waggons could go abreast. Statius calls it *the queen of roads*. Its course is described by Horace, Strabo, and Antonine.

APPIAN, an eminent writer of the Roman history in Greek, under the reigns of Trajan and Hadrian. He was of a good family in Alexandria in Egypt; whence he went to Rome, and there distinguished himself so well as an advocate, that he was chosen one of the procurators of the empire, and the government of a province was committed to him. He did not complete the Roman history in a continued series; but wrote distinct histories of all nations that had been conquered by the

Romans, in which he placed every thing relating to those nations in the proper order of time. His style is plain and simple: in the opinion of Photius, he has shown the greatest knowledge of military affairs, and the happiest talent at describing them, of any of the historians; for while we read him, we in a manner see the battles which he describes. Of all this voluminous work there remains only what treats of the Punic, Syrian, Parthian, Mithridatic, and Spanish wars, with those against Hannibal, the civil wars, and the wars in Illyricum, and some fragments of the Celtic or Gallic wars.

APPIUS CLAUDIUS, a Sabine by birth, one of the principal inhabitants of Regillum: his shining merit having drawn the envy of his fellow-citizens upon him, he retired to Rome with all his family. Appius was admitted into the senate, and was made consul, with Publius Servilius Priscus, in 258 from the building of Rome: but he was hated by the plebeians, being an austere opposer of their clamours and seditions. The Claudian family continued long one of the most illustrious of the patrician families in Rome; and several in succession of the name of Appius supported the same stern character that distinguished their first founder.

APPIUS CLAUDIUS, the decemvir. See **VIRGINIA**.

APPLAUSE, an approbation of something, signified by clapping the hands, still practised in theatres.—Applause, in antiquity, differed from acclamation*, as the latter was articulate and performed with the voice, the former with the hands. Among the Romans, applause was an artificial musical kind of noise, made by the audience or spectators to express their satisfaction. There were three species of applause, denominated from the different noises made in them, *viz. Bombus, Imbrices, and Teste*; the first a confused din, made either by the hands or the mouth; the second and third, by beating on a sort of sounding vessels placed in the theatres for this purpose. Persons were instructed to give applause with skill; and there were even masters who professed to teach the art. The proficient in this way let themselves out for hire to the vain-glorious among the poets, actors, &c. and were properly disposed to support a loud applause. These they called *Laudicani*, and *Exoptantes*. At the end of the play, a loud peal of applause was expected, and even asked of the audience, either by the chorus, or the person who spoke last. The formula was, *Spectatores plaudite, or Valet et plaudite*. The *plausores*, or applauders, were divided into chori, and disposed in theatres opposite to each other like the choristers in cathedrals, so that there was a kind of concert of applauses.

APPLE, the fruit of the *malus*, or apple-tree*.

APPLE of the eye, a name not unfrequently given to the pupil. See **ANATOMY**, n° 406, m.

APPLES of Love. See **LYCOPERSICON**.

MAD APPLES. See **MELONGENA**.

APPLEBY, the county-town of Westmoreland, where the assizes are held, is seated on the banks of the river Eden, which almost surrounds it. It was formerly a very considerable town, and had great privileges; but it is long ago gone to decay, and now only consists of mean houses in one broad street, which runs with an easy ascent from north to south; at the head of which is the castle, almost entirely surrounded by the river. It has two churches; a town-hall, in which the assizes

Appius
Claudius
Appley.

* See *Acclamation*.

* See *Malus*.

Application are held; a county jail; and an hospital for a governor and twelve widows, founded in 1651 by a daughter of lord Clifford. It is governed by a mayor, twelve aldermen, a common-council, and two sergeants at mace, &c. Here is said to be the best corn-market in these northern parts. W. Long. 3. 52. N. Lat. 54. 30. *

* See *Abul-laba*.

APPLICATION, in a general sense, is the laying two things together, in order to discover their agreement or disagreement.

APPLICATION, in geometry, is used either for division, for applying one quantity to another, whose areas, but not figures, shall be the same; or, for transferring a given line into a circle, or other figure, so that its ends shall be in the perimeter of the figure.

APPLICATION, among divines, a term used to signify the fame as imputation. See **IMPUTATION**.

APOGIATURA, in music, a small note inserted by the practical musician, between two others, at some distance.

APOINTEE, a foot soldier or officer in the French army who receives a greater pay than others of the same rank, in consideration of his valour or long service.

APOINTE, in heraldry, the same as *aguifée*: Thus we say, a cross appointed, to signify that with two angles at the end cut off, so as to terminate in points.

APOINTMENT, in a general sense, the same as assignation: See **ASSIGNATION**. In a more restrained sense, it signifies a pension given by princes and noblemen to retain certain persons in their service.

APOSITION, in grammar, the placing two or more substantives together in the same case, without any copulative conjunction between them; as, *Ardebat Alexim, delicias domini*.

APPRAISING, the act of rating, valuing, or setting a price on goods, by a person who is a competent judge, and is authorized thereto.

APPREHENSION, in logic, the first or most simple act of the mind, whereby it perceives, or is conscious of some idea.

APPRIISING, in Scots law, the name of that action by which a creditor formerly carried off the estate of his debtor for payment. It is now abolished, and adjudications are appointed in place of it.

APPROACH, or **APPROACHING**, in a general sense, the acceding or coming together of two or more things.

APPROACHES, in fortification, the works thrown up by the besiegers, in order to get nearer a fortress, without being exposed to the enemy's cannon.

APPROACHING, in fowling, a term used to express such devices as are contrived for the getting within shot of shy birds. It is principally used in marshy low places. The best method of approaching is by means of three hoops tied together at proper distances according to the height of the man that is to use it, and having boughs of trees tied all round it, with cords to hang it over his shoulders; a man getting into this, conceals himself, and approaches by degrees towards his game in the form of a moving bush. Geese, ducks, and teal, quit the waters in the evening, and pass the night in the fields; but at the approach of morning they return to the water again, and even when on the water they will retire to great distances, on the approach even of a horse or cow, so that the business of the stalking-horse is of little use; but this device of

approaching by the moving bush succeeds tolerably well with them.

APPROACHING, in gardening, the inoculating or ingrafting the sprig of one tree into another, without cutting it off the parent-tree.

APPROBATION, a state or disposition of the mind wherein we put a value upon, or become pleased with, some person or thing. Moralists are divided on the principle of approbation, or the motive which determines us to approve and disapprove. The Epicureans will have it to be only self-interest: according to them, that which determines any agent to approve his own action, is its apparent tendency to his private happiness; and even the approbation of another's action flows from no other cause but an opinion of its tendency to the happiness of the approver, either immediately or remotely. Others resolve approbation into a moral sense, or a principle of benevolence by which we are determined to approve every kind affection either in ourselves or others, and all publicly useful actions, which we imagine to flow from such affection, without any view therein to our own private happiness.

APPROPRIATION, in the canon law, a severing of a benefice ecclesiastical to the proper and perpetual use of some religious house. *

* See the article *Parson*.

The contrivance of appropriations seems to have sprung from the policy of the monastic orders, who have never been deficient in subtle inventions for the increase of their own power and emoluments. At the first establishment of parochial clergy, the tithes of the parish were distributed in a fourfold division; one for the use of the bishop, another for maintaining the fabric of the church, a third for the poor, and the fourth to provide for the incumbent. When the fees of the bishops became otherwise amply endowed, they were prohibited from demanding their usual share of these tithes, and the division was into three parts only. And hence it was inferred by the monasteries, that a small part was sufficient for the officiating priest; and that the remainder might well be applied to the use of their own fraternities, (the endowment of which was construed to be a work of the most exalted piety), subject to the burthen of repairing the church and providing for its constant supply. And therefore they begged and bought, for masses and obits, and sometimes even for money, all the advowsons within their reach, and then appropriated the benefices to the use of their own corporation. But, in order to complete such appropriation effectually, the king's licence, and consent of the bishop, must first be obtained; because both the king and the bishop may some time or other have an interest, by lapse, in the presentation to the benefice; which can never happen if it be appropriated to the use of a corporation, which never dies: and also because the law reposes a confidence in them, that they will not consent to any thing that shall be to the prejudice of the church. The consent of the patron also is necessarily implied, because the appropriation can be originally made to none but to such spiritual corporation as is also the patron of the church; the whole being indeed nothing else but an allowance for the patrons to retain the tithes and glebe in their own hands, without presenting any clerk, they themselves undertaking to provide for the service of the church. When the appropriation

is.

Appropriation
||
Appulse.

is thus made, the appropriators and their successors are perpetual parsons of the church; and must sue and be sued, in all matters concerning the rights of the church, by the name of *parsons*.

This appropriation may be severed, and the church become disappropriate, two ways; as, first, if the patron or appropriator presents a clerk, who is instituted and inducted to the parsonage: for the incumbent so instituted and inducted is to all intents and purposes complete parson; and the appropriation being once severed, can never be re-united again, unless by a repetition of the same solemnities. And, when the clerk so presented is distinct from the vicar, the rectory thus vested in him becomes what is called a *sine-cure*; because he hath no cure of souls, having a vicar under him to whom that cure is committed. Also, if the corporation which has the appropriation is dissolved, the parsonage becomes disappropriate at common law: because the perpetuity of person is gone, which is necessary to support the appropriation.

In this manner, and subject to these conditions, may appropriations be made at this day: and thus were most if not all of the appropriations at present existing originally made; being annexed to bishopricks, prebends, religious houses, nay, even to nunneries, and certain military orders, all of which were spiritual corporations. At the dissolution of monasteries, by statutes 27 Hen. VIII. c. 28. and 31 Hen. VIII. c. 13. the appropriations of several parsonages, which belonged to those respective religious houses, (amounting to more than one third of all the parishes in England), would have been by the rules of the common law disappropriated; had not a clause in those statutes intervened, to give them to the king in as ample a manner as the abbots, &c. formerly held the same at the time of their dissolution. This, though perhaps scarcely defensible, was not without example: for the same was done in former reigns, when the alien priories (that is, such as were filled by foreigners only) were dissolved and given to the crown. And from these two roots have sprung all the lay-appropriations or secular parsonages which we now see in the kingdom; they having been afterwards granted out from time to time by the crown. See the article *PARSON* and *Vicar*.

APPROXIMATION, in arithmetic and algebra, the coming nearer and nearer to a root, or other quantity sought, without expecting to be ever able to find it exactly.

APPUI, in the manege, (*q. d.* rest or stay upon the hand), is the reciprocal effort between the horse's mouth and the bridle-hand, or the sense of the action of the bridle on the hand of the horseman.

A just appui of the hand, is the sense bearing up or stay of the bridle, so that the horse, being awed by the sensibility and tenderness of his mouth, dares not rest too much upon the bit-mouth, nor check or beat upon the hand to withstand it. A horse is said to have no appui, when he is too apprehensive of the hand, and cannot bear the bit. He is said to have too much appui, when he rests or throws himself too much upon the bit. Horses designed for the army, ought to have a full appui upon the hand. To give a horse a good appui, he should be galloped, and put often back.

APPULSE, in astronomy, the approach of a planet

towards a conjunction with the sun or any of the fixed stars.

APRICOT, in botany. See *ARMENIACA*.

APRIES, son of Pfammis, king of Egypt; the fame with Pharaoh Hophrah in Jeremiah and Ezekiel. He ruined Sidon, and some say he put Jeremiah to death. He thought neither God nor man could de-throne him; which yet was easily done by Amasis, and he himself was strangled by the Egyptians.

APRIL, in chronology, the fourth month of the year, containing only 30 days.

A PRIORI, a kind of demonstration *.

APRON, in gunnery, the piece of lead which covers the touch-hole of a cannon.

APSIS, in astronomy, a term used indifferently for either of the two points of a planet's orbit, where it is at greatest or least distance from the sun or earth; and hence the line connecting those points is called the line of the *apsides*. The word is Greek, and derived from *απς*, to connect. The apsis at the greatest distance from the sun is called the *aphelion*, and at the greatest distance from the earth the *apogee*; while that at the least distance from the sun is termed the *perihelion*, and at the least distance from the earth the *perigee*.

APsis, among ecclesiastical writers, denotes the inner part of the ancient churches, answering to the modern choir. It is also used for the bishop's throne, and sometimes for the ambo. See *AMBO*.

APTA, or **APTA JULIA**, (Pliny); now *Apte*, in Provence, on the river Calavon, seven leagues to the north of Aix, and nine to the north of Avignon. In the Notitiæ it is called *Civitas Aptensium*; Pliny reckons it among the Latin towns. That it was a colony, appears from an inscription on a stone found at Arles, (Sirmond). E. Long. 5. 56. Lat. 43. 23.

APTERA, (Strabo, Stephanus); **APTERON**, (Pliny); **APTERIA**, (Ptolemy): an inland town of Crete, whose port was Cifamus, on the west side of the island, (Strabo); 12 miles to the south of Cydonia, towards the Montes Leuci, and as many from the Sinus Amphimales. So called from the Sirens, who, being there vanquished in song by the Muses, stript themselves of their wings, and out of grief leaped into the sea, (Stephanus). There was a town of Lycia of the same name. E. Long. 25. Lat. 35. 50.

APTERA, a term used by Linneus for his seventh order of insects, comprehending such as have no wings.

APTHANE, a title anciently given to the highest degrees of nobility in Scotland. See *THANE*.

APTOTE, among grammarians, an indeclinable noun, or one which has no variation of cases.

APULEIUS (Lucius), a Platonic philosopher, universally known by his performance of the Golden Ass. He lived in the second century, under the Antonines; and was born at Madaura, a Roman colony in Africa. He studied first at Carthage, then at Athens, and afterwards at Rome, where he learned the Latin tongue without the help of a master. He was a man of a curious and inquisitive disposition, especially in religious matters: this prompted him to take several journeys, and to enter into several societies of religion. He spent his whole fortune almost in travelling; so that, at his return to Rome, when he was about to dedicate himself to the service of Osiris, he had not money enough to defray the expence attending the ce-

Apricot
||
Apuleius.

* See Demonstration.

Apuleius.

remories of the reception, and was obliged to pawn his clothes to raise the necessary sum. He supported himself afterwards by pleading causes; and as he was a great master of eloquence, and of a subtle genius, many considerable causes were trusted to him. But he availed himself more by a good marriage than by his pleadings: a widow, named *Pudentilla*, who was neither young nor handsome, but wanted a husband, and was very rich, took a great fancy to him. This marriage drew upon him a troublesome law-suit. The lady's relations, pretending he made use of sorcery to gain her heart and money, accused him of being a magician before Claudius Maximus, proconsul of Africa. Apuleius was under no great difficulty of making his defence. As *Pudentilla* was determined, from considerations of health, to enter upon a second marriage, even before she had seen this pretended magician, the youth, deportment, pleasing conversation, vivacity, and other agreeable qualities of Apuleius, were charms sufficient to engage her heart. He had the most favourable opportunities too of gaining her friendship, for he lodged some time at her house: *Pudentilla's* eldest son having a great friendship for him, was likewise desirous of the match, and solicited him in favour of *Pudentilla*. "Do you make a wonder (said Apuleius, in his defence) that a woman should marry again, after having lived a widow 13 years? it is much more wonderful that she did not marry again sooner. You think that magic must have been employed to prevail with a widow of her age, to marry a young man; on the contrary, this very circumstance shews how little occasion there was for magic." He offered to prove by his marriage-contract, that he got nothing of *Pudentilla* but a promise of a very moderate sum, in case he survived her and had children by her. He was also obliged to make such confessions in court as *Pudentilla* would gladly have excused. He said she was neither handsome nor young, nor such as could any ways tempt him to have recourse to enchantments: moreover, he added, that Pontianus her son proposed the marrying his mother to him only as a burden, and the action of a friend and philosopher. He also took notice of many inconveniences which attend the marrying of widows, and spoke highly of the advantages of a maid above a widow: "A handsome virgin (said he), let her be ever so poor, is abundantly portioned; she brings to her husband a heart quite new, together with the flower and first-fruits of her beauty. It is with great reason that all husbands set so great a value upon the flower of virginity: all the other goods which a woman brings her husband are of such a nature, that he may return them again, if he has a mind to be under no obligation to her; that alone cannot be restored, it remains in the possession of the first husband. If you marry a widow, and she leaves you, she carries away all that she brought you." Upon which passage Mr Bayle makes a very coarse remark, viz. "That this good which is never taken back out of the hands of a husband, is very chimerical; and that there is never a baker nor a butcher, who would lend fixpence upon this unperishable possession." The apology is still extant, and is reckoned a very fine piece. Apuleius was extremely indefatigable in his studies; and composed several books, some in verse, and others in prose; but most of them have been lost. He took

great pleasure in declaiming, and was heard generally with great applause: when he declaimed at Oeca, the audience cried out with one voice, that they ought to confer upon him the honour of citizen. The citizens of Carthage heard him with great satisfaction, and erected a statue to him; and several other cities did him the same honour. Several critics have published notes on Apuleius's *Golden Ass*, and there have been translations of it into different languages.

APULIA, now **PUGLIA**, a territory of Italy, bordering on the Adriatic, and extending from the river Frento to Tarentum in length, and from the Adriatic to the Lucani in breadth. *Apuli* the people, (Horace), divided into the *Apulia Daunia*, now called *Puglia Pinna*, or the *Capitanata*; and into the *Apulia Peucetia*, now *Terra di Barri*, (Pliny, Ptolemy). *Apulia* abounded in sheep, which yielded the finest wool, (Martial). It is now the east side of the kingdom of Naples.

APYCNI *suoni*, in music, sounds distant one or more octaves, and yet concord.

APYCROS, in music, is said of the diatonic genus, on account of its having spacious intervals, in comparison of the chromatic and enharmonic.

APYREXY, among physicians, denotes the intermission of a fever.

APYROUS, a word applied to denote that property of some bodies, by which they resist the most violent fire without any sensible alteration. *Apyrous* bodies ought to be distinguished from those which are refractory. Refractory sublimates are those which cannot by violent heat be fused, whatever other alteration they may sustain. But a body, properly speaking, *apyrus*, can neither be fused by heat, nor can undergo any other change. Diamonds were long thought to be possessed of this property. But some late experiments have shown, that diamonds may be entirely dissipated or evaporated by heat, and are therefore not entitled to be ranked among *apyrus* sublimates. Perhaps there is no body in nature essentially and rigorously *apyrus*. But it is sufficient that there be bodies *apyrus* relatively to the degree of fire which art can produce, to entitle them to that name.

AQUA, a term frequently met with in the writings of physicians, chemists, &c. for certain medicines, or menstrua, in a liquid form, distinguished from each other by peculiar epithets, as *Aqua Alexiteria*, *Aqua Aluminosa*, *Aqua Mirabilis*, &c. for which see **PHARMACY**, n^o 501, &c.

Aqua Extincta, or **Extinguished Water**, is *aqua fortis* into which some river-water has been poured, in order to qualify it, and render it less corrosive. Its use is to get the silver from the *aqua fortis* that served to part gold from it.

Aqua Fortis, a name given by artists to nitrous acid of a certain strength, from its dissolving power *. * See C.

Aqua Marina, a name by which the jewellers call the beryl, on account of its sea-green colour †. † See B.

Aqua Regia, an acid corrosive spirit, so called because it serves as a menstruum to dissolve gold, commonly esteemed the king of metals *. * See C.

Aqua Secunda, is *aqua fortis* which has lost part of its dissolving quality, after being used in the parting of metals. †, n^o 1.

Aqua Vita, is commonly understood of what is otherwise

Apulia
||
Aqua Vita.

AQUÆ AUGUSTÆ
|
AQUÆDUCT.

otherwise called *brandy*, or spirit of wine, either mixed, or prepared with aromatics. Some, however, distinguish between them; appropriating the term *brandy* to what is drawn from wine, or the grape; and *aqua vite* to that drawn after the same manner, from malt, &c.

AQUÆ AUGUSTÆ, (Ptolemy); AQUÆ TARBELLICÆ, (Antonine); AQUENSIS CIVITAS, in the Notitia. Now *Aops*, or *Dax*, a town in Galceon, on the river Adour, famous for its baths. W. Long. 1° 40. Lat. 43. 56.

AQUÆ CUTILÆ, a lake of the Sabines, in the territory of Reate, (Pliny); LACUS CUTILIENSIS, (Varro); with a moveable island in it, (Seneca, Pliny); supposed to be the centre of Italy, (Varro). The waters were medicinal, and extremely cold, good for a weak stomach and in weak nerves, (Pliny). Vespasian used them every summer; and there he died, (Sueton, Xiphilin from Dio). Now *Lago di Contigliano*.

AQUÆDUCT, in hydraulics and architecture, a structure formed for conveying water from one place to another, over grounds that are unequal. The word is compounded of the Latin substantive *aqua* water, and of *ductus* a channel, by which that water may be conducted.

Architects distinguish two kinds of aqueducts; the *visible*, and the *subterraneous*.—The *visible* are constructed in valleys or marshes, and protracted in longitude or latitude as the situation requires. They are composed of adinacula for supporting the arches and confining the stream, and of arcades.—The *subterraneous* are formed, by piercing the mountains, and conducting them below the surface of the earth. They are built of stone, hewn or rough; and covered above with vaults, or with flat stones, which may be termed *flags*: these flags shelter the waters from the heat of the sun.

They divide them still into *double* and *triple* aqueducts; that is to say, such as are supported either by two or by three ranges of arcades. Such was the *aqueduct* which Procopius records to have been built by Cosroës king of the Persians, for the city of Petra in Mingrelia: it had three conduits upon the same line, each elevated above the other.

Frequently aqueducts are paved. Sometimes the waters flow through a natural channel of clay. Frequently they are conveyed by pipes of lead into reservoirs of the same metal, or into troughs of hewn stone. The channels are cut with an imperceptible descent, that the current may be accelerated by its own weight. Parallel to its course, on each side, is cut a narrow foot path, where people may walk when necessary. By conduits, or grooves, the waters are conveyed into large cisterns, but not forced above their original level. To make them rise and issue from their apertures with force, they must be confined in tubes of a small diameter, and abruptly fall from a considerable declivity.

Aqueducts of every kind were long ago the wonders of Rome. The vast quantity of them which they had; the prodigious expence employed in conducting waters over arcades from one place to another, at the distance of 30, 40, 60, and even 100 miles, which were either continued or supplied by other labours, as by cutting mountains and piercing rocks; all this ought to surprise us; nothing like this is undertaken in our times: we dare not even think of purchasing public convenience at so dear a rate. Appius the censor advised and

constructed the first *aqueduct*. His example gave the public luxury a hint to cultivate these objects; and the force of prodigious and indefatigable labour diverted the course of rivers and floods to Rome. Agrippa, in that year when he was edile, put the last hand to the magnificence of these works. It is chiefly in this respect that the modern so much resembles the ancient city of Rome. For this advantage, she is peculiarly indebted to Sextus V. and to Paul V. who for grandeur and magnificence emulated the masters of the universe *. There are still to be seen, in different places contiguous to Rome, striking remains of these *aqueducts*; arches continued thro' a long space, over which were extended the canals which carried the water to the city. The arches are sometimes low, sometimes raised to a vast height, to humour the tumidities or depressions of the ground. There are some which have two arcades, one constructed above the other; and this precaution was observed, lest the height of a single arcade, if extended as far as the situation required, might render the structure less firm and permanent. They are commonly of bricks; which by their cement cohere so strongly, that the parts are not separated without the utmost difficulty.—When the elevations of the ground were enormous, it became necessary to form *subterraneous* aqueducts. These carried the waters to such aqueducts as were raised above ground, in the declivity or at the foot of mountains. If the artificial channel of the water was not susceptible of a downward bias but by passing through a rock, through this they cut a passage at the same height with the superior aqueduct; such an one may be seen above the city of Tivoli, and at the place called *Vicaryre*. The canal which formed the course of the aqueduct is hewn out of the rock to the extent of more than a mile, about five feet in height, and four in breadth.

There is one thing, however, which deserves to be remarked. It is, that these *aqueducts*, which might have been directed in a straight line to the city, did not arrive at it but by frequent and winding mazes. Some have said that this oblique tract was pursued to avoid the expence which must attend the building of arcades to an extraordinary height: others, that it was their intention to diminish the impetuosity of the current; which, rolling in a straight line through an immense space, must always have increased its velocity, must have worn the canals by perpetual and forcible attrition, and of consequence afforded an impure and unwholesome draught to the inhabitants. But since there was so great a descent between the cascade of Tivoli and Rome, it is demanded why they should go to draw water from the same river at the distance of more than 20 miles higher; nay, of more than 30 miles, if we reckon the curvatures of its direction through that mountainous country. It is replied, the motive of obtaining the water more salubrious, and more limpid, was sufficient to make the Romans think their labour necessary, and their expence properly bestowed; and to those who reflect that the waters of this river were impregnated with mineral particles, and by no means wholesome, the answer will appear satisfactory.

If any one will cast his eyes upon plate 128th of the Antiquities of Father Montfaucon, he will see with how Vol. IV. much care these immense works were constructed. From distance to distance spiramenta were left, that, if the

Aquæducl.

* See New
Memoirs of
Italy, vol. I.

the water should happen to be stopped by any accident, it might gradually difembogue, till they could clear its ordinary passage. There were likewise, even in the very canals which conveyed the water, cavities considerably deeper than its internal surface, into which the stream was precipitated, and where it remained stagnant till it was refined from mud and feculence; and ponds, where it might expand itself till it was purified.

The *aquæduct* of the *aqua Marcia* had an arch of 16 feet in diameter. The whole was composed of three different kinds of stone; one of them redish, another brown, and a third of an earth colour. Above, there appeared two canals; of which the highest was fed by the new waters of the Tiverno, and the lower by what they call the *Claudian river*. The entire edifice is 70 Roman feet high. Near this *aquæduct*, we have in Father Montfaucon the plan of another with three canals; the highest supplied by the water called *Julia*, that in the middle from *Tepula*, and the lowest from the *aqua Marcia*.

The arch of the *aquæduct* of the *aqua Claudia* is of hewn stone, very beautiful; that of the *aquæduct* of the *aqua Neronia* is of bricks: they are each of them 72 Roman feet in height.

The canal of the *aquæduct* which was called the *aqua Appia*, deserves to be mentioned for a singularity which is observed in it: for it is not, like the others, plain, nor gradual in its descent; but much narrower at the lower than the higher end.

The consul Frontinus, who superintended the *aquæducts* under the emperor Nerva, mentions nine of them which had each 13594 pipes of an inch in diameter. Vigerus observes, that, in the space of 24 hours, Rome received 500,000 hogheads of water.

We might likewise have mentioned the *aquæduct* of Drusus, and that of Riminus: but we shall satisfy ourselves with observing here, that Augustus caused all the *aquæducts* to be repaired; and afterwards pass to other monuments of the same kind, and still more important, which give the most striking ideas of Roman magnificence.

One of these monuments is the *aquæduct* of Metz, of which a great number of arcades still remain. These arcades crossed the Moselle, a river which is broad and vast at that place. The copious sources of Gorze furnished water for the representation of a sea-fight. This water was collected in a reservoir: from thence it was conducted by subterraneous canals formed of hewn stone, and so spacious that a man could walk erect in them: it traversed the Moselle upon its superb and lofty arcades, which may still be seen at the distance of two leagues from Metz; so nicely wrought and so firmly cemented, that, except those parts in the middle which have been carried away by the ice, they have resisted, and will still resist, the fiercest shocks of the most violent seasons. From these arcades, other *aquæducts* conveyed the water to the baths, and to the place where the naval engagement was mimicked.

If we may trust Colmenarus, the *aquæduct* of Segovia may be compared with the most admired labours of antiquity. There still remain 159 arcades, wholly consisting of stones enormously large, and joined without mortar. These arcades, with what remains of the edifice, are 102 feet high; there are two ranges of arcades, one above another. The *aquæduct* flows thro'

the city, and runs beneath the greatest number of houses which are at the lower end.

After these exorbitant structures, we may be in some degree believed when we speak of the *aquæduct* which Lewis XIV. caused to be built near Maintenon, for carrying water from the river Buçq to Versailles: it is perhaps the greatest *aquæduct* which now subsists in the world; it is 7000 fathoms in length, above 2560 in height, and contains 242 arcades.

AQUÆ FLAVIÆ, a town on the confines of Gallicia and Portugal, so called from Vespasian and Titus. The inhabitants are called *Aquiflavenses*, (Coins). Now called *Chiaves*, a mean hamlet: but the ruins of its bridge testify its former grandeur. W. Long. 6. 6. Lat. 41. 40.

AQUÆ TAURI, hot waters or baths in Tuscany, at the distance of three miles from the sea, said to be discovered by a bull; whence the appellation. There are still to be seen the ruins of these baths. The people are called *Aquenses Taurini*, (Pliny). Now *Acquapendente*, in Orvieto. E. Long. 12. 40. Lat. 42. 40.

AQUAMBOE, one of the greatest monarchies on the coast of Guinea in Africa, stretching twenty miles in breadth, and ten times that space in length from east to west. According to Bosman, the coast is divided into a great number of petty royalties, but all of them subject to the king of Aquamboe, who indifferently uses an unlimited authority over them and the meanness of his subjects. His despotism gave rise to a proverbial saying, that "there are only two ranks of men at Aquamboe; the royal family, and slaves." The natives of this country are haughty, turbulent, and warlike; and their power is formidable to all the neighbouring nations. They grievously infect such nations as are tributaries to the king of Aquamboe, entering their territories by troops, carrying off from the inhabitants whatever they think proper; nor do they ever meet with any opposition from the inhabitants, as they are sensible the king would not fail to resent this as an indignity offered to him.

AQUARIANS, Christians in the primitive church who consecrated water in the eucharist, instead of wine. This they did under pretence of abstinence and temperance; or, because they thought it universally unlawful to eat flesh, or drink wine. Epiphanius calls them *Encratites*, from their abstinence; St Austin, *Aquarians*, from their use of water; and Theodoret, who says they sprang from Tatian, *Hydroparastata*, because they offered water instead of wine.

Besides these, there was another sort of Aquarians, who did not reject the use of wine as unlawful; for they administered the eucharist in wine at evening service: but, in their morning assemblies, they used water, for fear the smell of wine should discover them to the heathens.

AQUARIUS, in astronomy, a constellation which makes the eleventh sign in the zodiac, marked thus ♒.

AQUARTIA, in botany, a genus of the tetrandria monogynia class. There is only one species, called *aculeata*, a native of Europe.

AQUATIC, in natural history, an appellation given to such things as live or grow in the water.

AQUAVIVA, a town of the kingdom of Naples, and province of Barri.

AQUEDUCT. See *AQUÆDUCT*.

AQUEOUS,

Aqueous
||
Aquilegia.

Aquileia
||
Aquino.

AQUEOUS, in a general sense, something partaking of the nature of water, or that abounds with it.

AQUEOUS Humour. See **ANATOMY**, n° 406, q.

AQUILA, in ornithology, a synonyme of the falco, or eagle. See **FALCO**.

AQUILA, in astronomy, a constellation of the northern hemisphere.

AQUILA, a fine large city of Italy, and the capital of Abruzzo, seated on a hill, on the banks of the river Pescara, near its source. It has an ancient castle, and is a bishop's see immediately under the pope. The land about it produces great plenty of saffron. It was very near being all destroyed by an earthquake, in February 1703. The first shock was so terrible, that the inhabitants abandoned the city; but returning to vespers, it being Candlemas-day, the flocks followed one another with such violence, that twenty-four thousand people perished, and great numbers were wounded; eight hundred were killed in one single church: many other churches, monasteries, noble buildings, and the town-house, were either swallowed up or overturned, together with the greater part of the city and its walls. Aquila stands thirty miles from the sea, and about sixteen from the confines of the Pope's dominions. E. long. 14. 20. N. Lat. 42. 20.

AQUILEGIA, **COLUMBINE**, a genus of the pentagynia order, belonging to the polyandria class of plants.

Species. 1. The vulgaris or wild columbine, with blue flowers, is found growing wild in some woods of England. 2. The alpina, with long oval flowers, grows naturally near Ingleborough-hill in Yorkshire. The flowers are much larger than those of the garden columbine. 3. The inverfa, or garden columbine. Of this there are great varieties, not only in the colour and fullness of their flowers, but also in their form. These are commonly called *rose columbines*; the colours are chestnut, blue, red, and white, and some are finely variegated with two colours. There are others with sharp-pointed petals in form of a star, and of these there are single and double flowers of the same colours with the former. 4. The canadensis, or Canada columbine, flowers almost a month before the other sorts, and therefore is preferred in the gardens of the curious, though not at all remarkable for its beauty. There is a variety of this with taller flower-stems.

Culture. These plants are all propagated by sowing the seeds, or parting the old roots; but the former method is chiefly practised, for the old roots are very apt to degenerate. The seeds should be sown in a nursery-bed in August or September; for those which are kept till the spring seldom grow well, or at least remain in the ground a whole year. The spring following the plants will appear above ground, and should be kept clear of weeds; and if the season proves dry, they must be watered. In the middle or latter end of May, they will be strong enough to transplant; for which purpose, some beds of good undunged earth should be prepared, planting them therein at eight or nine inches distance from each other. In the following autumn, by which time the plants will have acquired strength enough to flower the year following, the roots should be carefully taken up and planted in the borders of the flower-garden: but where their roots are designed to be preserved in perfection, all the flower-stalks must

be cut off as soon as the flowers are past. In order to keep up a succession of good flowers, fresh seeds should be sown every year; and it will likewise be advantageous to exchange the seeds with some brought from a distant place.

Medicinal Uses. Columbine has been looked upon as aperient; and was formerly in great esteem among the common people for throwing out the small-pox and measles. A distilled water, medicated vinegar, and conserve, were prepared from the flowers; but they have long given place to medicines of greater efficacy.

AQUILEIA, a large city of the Carni, or Veneti, and a noble Roman colony, which was led thither between the first and second Macedonian wars, (Livy). It is washed by two rivers, the Natiso and Turrus, (Pliny). The reason of leading this colony was, in order to be a bulwark against the neighbouring barbarians. The colony was afterwards increased with fifteen hundred families by a decree of the senate, (Livy); from which it became a very famous port-town, (Herodian). The emperor Julian ascribes the appellation to the augury of an eagle at the time of building it; but Isaac Vossius on Mela, to the great plenty of water, as if the town were called *Aquilegia*. The harbour, at the mouth of the Natiso, is distant sixty stadia from the city; so that ships of burden are towed up the river, (Strabo). It is still called *Aquileia*, but greatly fallen from its former splendor. E. Long. 15. 32. Lat. 45. 45.

AQUILICUM, or **AQUILICIANA**, in Roman antiquity, sacrifices performed in times of excessive drought, to obtain rain of the gods.

AQUILINE, something belonging to or resembling an eagle: Thus, an aquiline nose is one bent somewhat like an eagle's beak.

AQUINAS (St Thomas), styled the *Angelical Doctor*, was of the ancient and noble family of the counts of Aquino, descended from the kings of Sicily and Arragon; and was born in the castle of Aquino, in the Terra di Lavoro in Italy, in the year 1224 or 1225. He entered into the order of the Dominicans; and, after having taught school-divinity in most of the universities of Italy, at last settled at Naples: where he spent the rest of his life in study, in reading of lectures, and in acts of piety; and was so far from the views of ambition or profit, that he refused the archbishopric of that city, when it was offered him by Pope Clement IV. He died in 1274, leaving an amazing number of writings, which were printed at Venice in 17 vols folio, in the year 1490. He was canonized by Pope John XXII. in the year 1323; and Pius V. who was of the same order with him, gave him, in 1567, the title of the Fifth Doctor of the church, and appointed his festival to be kept with the same solemnity as those of the other four doctors. His authority has always been of great importance in the schools of the Roman Catholics. Lord Herbert, in his Life of Henry VIII. tells us, that one of the principal reasons which induced that king to write against Luther, was, that the latter had spoken contemptuously of Aquinas.

AQUINO (Philip d'), in Latin *Aquinas* or *Aquinar*, having turned from Judaism, had a pension from the clergy of France; and acquired much reputation by his knowledge

Aquino
Arabia.

knowledge of the Hebrew language, which he taught at Paris, in the reign of Lewis XIII. and by the books he published, among which is his *Diffinitivum Hebræo-Chaldeo-Thalmudico-Rabbinicum*. His grandson, Anthony D'Anquin, was first physician to Lewis XIV.

AQUINO, a town of Italy, in the kingdom of Naples, and Terra di Lavoro; a bishop's see, but ruined by the emperor Conrade; and now consists of about 35 houses. It was the birth-place of the poet Juvenal, and Thomas Aquinas. E. Long. 14, 30. N. Lat. 41, 32.

ARA, in astronomy, a southern constellation, containing eight stars.

ARABIA, a country of Asia, famous from the remotest antiquity for the independency of its inhabitants during the vast conquests of the Assyrians, Persians, Greeks, and Romans; and, in latter times, for being the centre of an empire equal, if not superior, in extent to any that ever existed.

This country, or at least the greatest part of it, was in the earliest ages called *Arabia*: concerning the etymology of which word there are various conjectures; but the most probable is, that it is derived from the Hebrew word *אֲרָבָא*, signifying, *the west, mixture, or traffic*. In its largest extent, Arabia lies between the 12th and 35th degrees of N. Lat. and the 36th and 61st of E. Long. Its greatest length from north to south is about 1100 miles, and its breadth from east to west between 1300 and 1400. It is bounded on the west by Palestine, port of Syria, the isthmus of Suez, and the Red sea, called by the Arabs the sea *Al Kolsom*; on the east by the Euphrates, the Persian gulf, and bay of Ormus; on the north by part of Syria, Diyar-Beer, Irak, and Khuzestan; and on the south by the straits of Babel Mandel, and the Indian ocean. It grows narrower as we approach the frontiers of Syria and Diyar-Beer; and, by reason of the proximity of the Euphrates to the Mediterranean, may be looked upon as a peninsula, and that one of the largest in the whole world.—Arabia Proper, however, is much narrower, including little more than what was comprehended by the ancients under the name of Arabia Felix, which we shall presently describe; and here the Arabs have been settled almost since the flood.

The first division of the peninsula of Arabia was into *Arabah* and *Kedem*, as we learn from Scripture; the first of which implies the west, and the other the east, denoting the situation of the two countries.—Ptolemy was the first who divided the peninsula we speak of into three parts, Arabia Petraea, Arabia Deserta, and Arabia Felix, which division has generally prevailed since his time.

Arabia Petraea, on the east, was bounded by Syria and Arabia Deserta; on the west by Egypt, or rather the Isthmus of Suez which separates Asia from Africa, and the Heroopolitain gulph or western arm of the Red Sea. On the north it was bounded by Palestine, the lake Asphaltites, and Cœlosyria; and on the south by Arabia Felix. This tract did not admit of much cultivation, the greatest part being covered with dry sands, or rising into rocks, interspersed here and there with some fruitful spots. Its metropolis was Petra, which by the Syrians was styled *Rakam*, and in Scripture *Joktheel*. Several other cities of Arabia Pe-

traea are mentioned by Ptolemy; but as it is very improbable such a barren country should abound with large cities, we must look upon them as inconsiderable places.

Arabia Deserta was bounded on the north by the Euphrates, which separated it from Melopotamia; on the west by Syria, Judæa, and Arabia Petraea; on the east, by a ridge of mountains which separated it from Babylonia and Chaldea; on the south, by Arabia Felix, from which it was likewise separated by several ridges of hills. By far the greatest part of this kingdom, as well as the former, was a lone some desert, diversified only with plains covered with sand, or mountains consisting of naked rocks and precipices; nor were they ever, unless sometimes at the equinoxes, refreshed with rain. The few vegetables which they produced were stunted by a perpetual drought, and the nourishment afforded them by the nocturnal dews was greatly impaired by the heat of the sun in the day-time. Throughout the deserts were found huge mountains of sand, formed by the violence of the winds that continually blew over them in the day-time, though they ceased in the night. Wells and fountains were for the most part exceedingly rare; however, notwithstanding the sterility of these countries, the vast plains of sand just now mentioned were interperfed with fruitful spots, which appeared here and there like so many islands in the midst of the ocean. These being rendered extremely delightful by their verdure, and the more so by the neighbourhood of those frightful deserts, the Arabs encamped upon them; and having consumed every thing they found upon one, removed to another, as is the custom of their descendants the Bedouens at this day. These fruitful spots were likewise frequent in Libya, and by the Egyptians called *ausser*, or *abaser*, as we learn from Strabo. The barren part of Arabia Felix, bordering upon the Red Sea, was in like manner interperfed with abases; which probably gave the name of *Abaseni* to a nation settled there, and in the adjacent fertile region. A body of these, it is said, crossing the straits of Babel-Mandel, passed into Ethiopia, which from them received the name of *Abassia*. From this account of Arabia Deserta, we may reasonably conclude, that the towns said by Ptolemy to have been situated in it were places of very little consequence.

Arabia Felix was bounded on the north by the two kingdoms just described; on the south, by the Red sea; on the east and west, by part of that sea, together with the Arabian and Persian gulfs. In Strabo's time, it was divided into five provinces, by the oriental historians called *Yaman*, *Hejaz*, *Tahima*, *Najd*, and *Yamama*; for a particular description of which, see those articles. In this district stood several towns, particularly Nyfa, famous for being the birth-place of Bæchus; and Mufa, or Muza, a celebrated emporium or harbour, where the Arabian merchants resorted with their frankincense, spices, and perfumes. These two were situated in the province of Yaman. In that of Hejaz stood the still more famous cities of Mecca and Medina; also Thaifa or Taifa, Gjudda or Jodda, Yanbo or Al Yanbo, and Madian, the Modiana of Ptolemy, and the Midian or Madian of Scripture.

At what time the abovementioned kingdoms were first peopled we have no certain accounts. The most considerable nations inhabiting Arabia Petraea, in the early ages, were the Ihmaelites, the Nabatei or Nabatheans,

1
Whence
named.

2
Boundaries,
&c.

3
Division.

4
When pro-
pled.

Arabia.

theans, the Cedraï or Kedareni, and the Agareni or Hagareni; and of these the Ishmaelites were the most powerful, if they did not comprehend all the rest; and if the Hagareni were not the same people with them, they must at least have been nearly related. Kimchi, an oriental historian, insinuates, that they were originally the children of Hagar by an Arab, after she had left Abraham. In after ages, the names of all the nations situated here were absorbed in that of *Saraceni*, by which the Ishmaelites are distinguished in the Jerusalem Targum. A nation also is mentioned by Pliny, called *Arraceni*, and *Sarraceni* by Ptolemy and Diofcorides, which was probably no other than the Ishmaelites above mentioned. In Arabia Deserta several tribes resided, all of whom were very obscure, except the Aisfæ and Agzæi. The former are supposed by Bochart to have been Job's countrymen, and the latter to have been the same with the Hagareni, Arraceni, or Sarraceni, above mentioned. Arabia Felix was inhabited by many different tribes; the most remarkable of which were the Sabæi, Gerzæi, Minæi, or Minzæi, Atramitæ, Maranitæ, Catabani, Ascitæ, Homeritæ, Sapphoritæ, Omanitæ, Saraceni, Nabathæi, Thamydeni, and Enizomenæ; but neither their limits nor situation can now be determined with any manner of precision.

5
Division of
the Arabs.

According to the Oriental historians, the Arabs are to be divided into two classes; viz. the *old* *lost* *Arabians*, and the *present*. The most famous tribes among the former were those of Ad, Thâmod, Tâfîm, Jadès, Jorham, Amalek, Antem, Hasbem, Abil, and Bâr. Concerning these, though now entirely lost, and swallowed up among other tribes, there are some remarkable traditions, of which the following may serve as a specimen.

6
Tradition
concerning
Ad.

The tribe of Ad deduced their origin from Ad the son of Aws, or Uz, the son of Aram, the son of Shem, who, after the confusion of tongues, settled in Al Abkaf, or the winding sands in the province of Hadramant, on the confines of Yaman, where his posterity greatly multiplied. Their first king was Sheddâd, the son of Ad, who built a stately palace and made a delightful garden in the deserts of Âden, which he designed as an imitation of the celestial paradise. This garden he called *Irem*: and when it was finished, he set out with a great retinue to take a view of it; but, having some thoughts of assuming divine honours, he was destroyed by a tempest from heaven, while yet a day's journey from his paradise. The garden and palace, however, were preserved, though invisible, as a monument of divine vengeance.

After the death of Sheddâd, the kingdom of Ad was governed by a long series of princes, concerning whom many fables are related by the eastern writers. The conclusion of their history, however, is as follows. "The Adites, in process of time falling from the worship of the true God, into idolatry, God sent the prophet Hûd, supposed to be the same with Heber, to preach to and reclaim them. But they refusing to acknowledge his mission or to obey him, God sent an hot and suffocating wind, which blew seven nights and eight days, and, entering at their nostrils, passed thro' their bodies, and destroyed them all, a very few only excepted, who had listened to Hûd, and retired with him to another place." Others relate, "that, before this terrible catastrophe, they had been previously chastised

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with a three years drought; and therefore sent Kail Ebn Ithar, and Morthed Ebn Saad, with 70 other principal men to Mecca, then in the hands of the tribe of Amalek, whose prince was Moawiyah Ebn Becr, to obtain of God some rain. Kail having begged of God that he would send rain to the people of Ad, three clouds appeared, a white, a red, and a black one; and a voice from heaven ordered him to chuse which he would. Kail failed not to make choice of the last, thinking it would be laden with most rain; but when this cloud came over them, it proved to be fraught with the Divine vengeance, and a tempest broke forth from it which destroyed them all."

The *present* *Arabs*, according to their own historians, are sprung from Kahtan, the same with Joktan, the son of Eber; and Adnan, descended in a direct line from Ishmael the son of Abraham. The former of these they call the *genuine* or *pure* Arabs, and the latter the *naturalized* or *infinitious* Arabs.

7
Arabs from
whom de-
scended.

Joktan the son of Eber had 13 sons, who some time after the confusion of languages settled in Arabia, extending themselves from Mesha to Sephar, a mountainous place in the south-eastern part of that peninsula. According to the Arabian historians, he had 31 sons, all of whom left Arabia and went into India, except two, viz. Yarab and Jorham; the former of whom, they say, gave the name both to their country and language. Ishmael and his mother Hagar having been dismissed by Abraham, entered into the wilderness of Paran, as related in the book of Genesis. The sacred historian informs us, that during his residence in the wilderness he married an Egyptian; and the Arabian writers say that he also took to wife the daughter of Modad king of Hejaz, lineally descended from Jorham the founder of that kingdom. By the Egyptian, he was probably the father of the Scenite or wild Arabs; and having allied himself to the Jorhamites, he is considered by the Arabians as the father of the greatest part of their nation.

Kahtan, or Joktan, is said to have first reigned, and worn a diadem in Yaman; but the particulars of his reign we no where learn. He was succeeded by Yarab already mentioned, he by Yafhab, and Yafhab by Abd Shems. He was successful in his expeditions against his enemies, carried off great spoils, and took many of them prisoners. He is said to have built the city of Saba or Mareb, and above it a stupenduous mound or building which formed a vast reservoir, containing all the water that came down from the mountains. By means of this reservoir the kings of Yaman not only supplied the inhabitants of Saba and their lands with water, but likewise kept the territories they had subdued in greater awe, as by cutting off their communication with it they could at any time greatly distress them.

8
Joktan the
first king.

Abd Shems was succeeded by his son Hamyar, from whom the tribe of Hamyar is said to take its name; and he by a series of 17 kings, concerning whom we have no remarkable particular, except that from one of them called *Africus* the continent of Africa took its name. The last of these was succeeded by a daughter named *Balkis* or *Beltis*, whom some will have to be the queen of Sheba who paid a visit to Solomon. After *Balkis* came *Malea*, surnamed *Nafherolneam* on account of his magnificence and liberality. Having had success in an expedition, where his army was over-

9
Reservoir of
Saba.

10
Balkis sup-
posed to be
the queen of
Sheba.

Z z z

whelmed

Arabia.

11
Samarcand,
by whom
built.

whelmed by torrents of sand, he caused a brazen statue to be erected with the following inscription in the old Hamyaritic character. "There is no passage behind me, no moving farther; the son of Sharhabil." He was succeeded by Shamar Yarsafu, so called on account of his being affected with a constant tremor. To this prince the city of Samarcand was said to owe its existence. After Shamar Yarsafu we have a list of 15 kings, of whom nothing worth mentioning is recorded, except of one Abu Carb Afaad, who adorned the Caaba or temple of Mecca with tapestry, and first introduced Judaism among the Hamyarites. He was put to death by his subjects, probably on account of religion. The last of the 15 kings above-mentioned was called *Abrahah*, who was succeeded by his son Sabban. He had that famous sword called *Samsanah*, which afterwards came into the hands of the Khalif Al Rashid. This prince was succeeded by Dhu Shanater, who had six fingers on each hand. He was abandoned to unnatural lust, and dethroned for abusing some of the noblest youths in the kingdom. To him succeeded Yusef, who lived about 70 years before Mahomet. He persecuted all those who would not turn Jews, putting them to death by various tortures, the most common of which was throwing them into a glowing pit of fire; whence he had the appellation of *the lord of the pit*. This persecution is taken notice of in the Koran. The last of the Hamyaritic monarchs was Dhu Jadani, according to Abulfeda; but, according to others, the Yusef just mentioned, who was surnamed *Dhu Nowas* on account of his flowing curls, and was the last who reigned in an uninterrupted succession. He was a bigotted Jew, as already mentioned; and treated his subjects with such barbarity, that they were obliged to ask the assistance of Elefbaas or Elefban, king of Ethiopia, against him. Dhu Nowas, not being able to make head against the Ethiopians, was at last driven to such extremity, that he forced his horse into the sea, and lost both his life and crown together.

23
His subjects
call in the
king of E-
thiopia, who
dethrones
Yusef.

24
Christian re-
ligion esta-
blished in
Arabia.

25
Ethiopians
driven out.

26
Terrible in-
undation by
the break-
ing down of
the reservoir
of Saba.

The king of Ethiopia, having thus become master of Yaman, established there the Christian religion, and fixed upon the throne one Abryat an Ethiopian. He was succeeded by Abrahah-Ebn-Al-Sabah, surnamed *the blind*, from a wound he had formerly received in it. He was likewise surnamed *lord of the elephant*, from a story too ridiculous to deserve notice. He was succeeded by two other Ethiopian princes; but at last Seif Ebn Dhu Yazan, of the old royal family of Hamyar, having obtained assistance from the king of Persia which had been denied him by the emperor Heraclius, recovered his throne, and drove out the Ethiopians; but was himself slain by some of them who were left behind. The succeeding princes were appointed by the Persians, till Yaman fell into the hands of Mahomet.

We have already taken notice of the vast mound or reservoir made by Abd Shems, from which he supplied the city of Saba with water. This building stood like a mountain above the city, and was by the Sabæans esteemed so strong, that they were under no fear of its ever failing. The water rose almost to the height of 20 fathoms; and was kept in on every side by a work so solid, that many of the inhabitants had their houses upon it. About the time of Alexander the Great, however, a terrible inundation happened. According to the Arabian historians, God being displeased at the

pride and insolence of the inhabitants of this city, resolved to humble them; and for this purpose sent a mighty flood, which broke down the mound by night, while the inhabitants were asleep, and carried away the whole city with the neighbouring towns and people. This inundation is styled in the Koran the *inundation of Al-Harem*; and occasioned so terrible a destruction, that from thence it became a proverbial saying to express a total dispersion, "that they were gone and scattered like Saba."—By this accident no less than eight tribes were forced to remove their habitations, some of which gave rise to the kingdoms of Hira and Ghassan.

The kingdom of Hira was founded by Malec, a descendant of Cahlan the brother of Hamyar; but after three descents, the throne came by marriage to the Lakhmians, who were descendants of Lakhm the son of Amru, the son of Abd Ems. These princes, whose general name was *Mondar*, preserved their dominion, notwithstanding some small interruption from the Persians, till the khalifat of Abubecr, when Al Mondar Maghrur, the last of them, lost his life and crown by the arms of Khaled-Ebn-Al-Walid. This kingdom continued 622 years and eight months, according to Ahmed Ebn Yusef. Its princes were under the protection of the kings of Persia, and were their lieutenants over the Arabs of Irak, as the kings of Ghassan were for the Roman emperors over those of Syria.

The kingdom of Ghassan was founded by the tribe of Azd, who, according to some, settling in Syria Damascus, near a water called *Ghassan*, from thence took their name; but others say they went under this appellation before they left Yaman. Having driven out the Dajassian Arabs, who before possessed the country, they made themselves masters of a considerable territory. Here they maintained themselves, according to some 400, according to others 600, and according to Abulfeda 613 years, when the last of their kings submitted to the khalif Omar, and embraced the Mahometan religion; but receiving afterwards a disgust, soon returned to Christianity, and took refuge in Constantinople.

The kingdom of Hejaz was founded by Jorham the son of Kahtan, where princes of his line reigned till the time of Ishmael, who married the daughter of Modad one of those princes. Some authors relate that Kidar, one of Ishmael's sons, had the crown resigned to him by his uncles the Jorhamites; but, according to others, the descendants of Ishmael expelled that tribe; who, retreating to Johainah, were after various adventures destroyed by an inundation. After the expulsion of the Jorhamites, the government of Hejaz seems not to have continued long in the hands of one prince, but to have been divided among the heads of tribes, almost in the same manner as the Arabs of the desert are governed at this day. The tribe of Khozaab, after the abovementioned inundation of Saba, fled into the kingdom of Hejaz, and settled themselves in a valley called *Marri* near Mecca. Here they founded an aristocracy, assuming to themselves both the government of the city of Mecca, and the custody of the Caaba or temple there. They continued masters of this city and territory, as well as presidents of the Caaba, for many ages; till at length one Kofa, of the tribe of Koreih, circumvented Abu Gashlan, a weak and silly man, of whom, while in a drunken humour, he bought the keys of the

Arabia.

17
Origin, &c.
of the king-
dom of Ili-
ra.

18
Of Ghassan.

19
Of Hejaz.

20
Tribe of
Khozaab a
funes the
government
of Mecca.

Arabia.

21
Tolly of A-
bu Gabhan.

the temple for a bottle of wine; but when Abu Gabhan grew cool, and reflected on his imprudence, he sufficiently repented of what he had done; whence the Arabian proverb, "More vexed with late repentance than Abu Gabhan; More foolish than Abu Gabhan," &c. The tribe of Khozaab endeavoured afterwards to give some disturbance to the Koreish in the possession of the keys of the Caaba, which furnished the latter with a pretence for depriving them of the civil government of Mecca. After the Koreish had possessed themselves of this city, they kept up the same form of government which had prevailed there before. Besides these kingdoms there were many others of lesser note, of which we find nothing remarkable.

Thus we have briefly mentioned the most memorable events recorded by the Arabian historians previous to the time of Mahomet; but, before entering upon an account of that famous impostor and the kingdom founded by him, it will be proper to take notice of several circumstances in different parts of the world, which at that time concurred to facilitate Mahomet's scheme, and without which, in all probability, he would never have been able to accomplish it.

22
Causes of
Mahomet's
success.

The first and great cause of Mahomet's success in propagating his infamous imposture, was the gross corruption and superstition with which the Christian religion was at that time obscured in all parts of the world. Had the pure doctrines of Christianity been then as publicly known, as the ridiculous fopperies which deformed the Eastern and Western churches, Mahometanism could never have got a hearing. But, along with the true religion, mankind seemed also to have lost the use of their rational faculties, so that they were capable of swallowing the grossest absurdities; such as it now appears almost incredible that any of the human race could receive as truths. Another cause was, the manner of government and way of life among the Arabs. Divided into small independent tribes, they never were capable of a firm union but by superstition; and had Mahomet attempted their conquest in any other way, it was impossible he could have succeeded. As there were also among them Jews, Pagans, and Christians of all sorts, this impostor, by adopting something out of every religion then extant, cunningly recommended himself to the professors of every one of them. Added to all this, that, by allowing of polygamy, and setting forth his paradise as consisting in the enjoyment of women, he adapted himself to the corrupt dispositions of mankind in general.

If the distracted state of religion favoured the designs of Mahomet on the one hand, the weakness of the Grecian and Persian monarchies assisted him no less powerfully on the other. Had those once formidable empires been in their vigour, either of them would have been sufficient to crush Mahometanism in its birth; but both of them were then strangely reduced. The Roman empire had continued to decline after the time of Constantine; the western parts of it were then entirely over-run by the Goths and other barbarous nations; and the eastern, or Greek empire, was so much reduced by the Huns on one hand, and the Persians on the other, as to be incapable of making any great effort. The Persian monarchy itself was in little better condition. It is true, they ravaged the dominions of the Greeks, and often overcame them in the field; but

that was more owing to the weakness of the Grecian empire, than to the strength of the Persians; and so effectually did the intestine broils, which arose chiefly on account of religion, weaken the kingdom of Persia, that the most considerable part of it was annexed by the khalif Omar to his dominions.

As the Greeks and Persians were then in a languishing situation, so the Arabs were strong and flourishing. Their country had been peopled at the expence of the Grecian empire, whence the violent proceedings of the different religious sectaries forced many to take refuge in Arabia. The Arabs were not only a populous nation, but unacquainted with the luxuries and delicacies of the Greeks and Persians. They were inured to hardships of all kinds, and consequently much better fitted than their effeminate neighbours to endure the fatigues of war, as the event very fully verified.

Mahomet was born in the year of Christ 578. According to the Eastern historians, he was descended in a direct line from Ishmael. Kedar, or, as the Arabians call him, *Kidâr*, after his father Ishmael's death, communicated his name to the greatest part of Arabia Petraea. He was succeeded in his authority and possessions by his son Hamal; Hamal by Nabet, and Nabet by Salaman. After Salaman came Al Homeia, then Al Yafa, whose son Odad was succeeded by Odd the father of Adnan. Counting ten generations forward in the same line, we come at last to Fehr, who seems to have distinguished himself by some glorious actions, as he was denominated *Koreish*, on account of his bravery. He is to be considered as the root of the politest and most celebrated tribe of the Arabs. He had three sons, Galeb, Mohâreb, and Al Hâreth. From Mohâreb the Banu Mohâreb, denominated likewise *Sheibân*, took their origin; from Al Hâreth, the Banu Al Kholoj; and from Galeb, in a direct line, the impostor Mahomet. Galeb was the father of Lowa; and he of Caab, whose son Morrah had for his immediate descendant Kelâb the father of Kofa. It was this Kofa who aggrandized the tribe of the Koreish, by purchasing the keys of the Caaba from Abu Gabhan, as we have already related. By this he not only aggrandized his tribe, but became the prince of it himself. He was succeeded by his second son Abd Menâf, to whom the *prophetic light*, which is said to have manifested itself in his face, gave the right of primogeniture. Abd Menâf was succeeded by his son Ammi, surnamed *Adhem*, or one that broke bread, on account of his singular generosity during a famine at Mecca. Having amassed great sums of money, he took a journey into Syria, where he purchased a vast quantity of meal, which he made into cakes and divided with his own hands amongst the people of Mecca. He likewise killed a prodigious number of camels, with which he fed them, and relieved them in the time of their distress; and finding that the soil about Mecca was so barren as to produce no fruits but what are common in the deserts, and consequently no corn or grain, which the Meccans are obliged to bring from other places, he appointed two caravans to set out yearly for that purpose, the one in summer, and the other in winter; by means of which, the city was amply supplied with provisions of all kinds. The provisions brought by them were distributed twice a-year; and Hâthem, by his prudent conduct, raised the glory of his people to the highest pitch; inasmuch, that all

Arabia.

23
Mahomet's
birth, de-
scend, &c.

24
Fehr head
of the Ko-
reish.

25
Hâthem's
generosity.

Arabia.

the neighbouring great men, and heads of tribes made their court to him. Nay, so great veneration is the memory of Hâshem held in by the Arabs, that from him the family of Mahomet among them are called *Hâshemites*; and he who presides over Mecca and Medina, who must always be of the race of Mahomet, has to this day the title of the "Chief or Prince of the Hâshemites."

Hâshem died at Gaza in Syria, and was succeeded by his son Abdal Motalleb or Mateleb. He is said to have been extremely affable and easy of access, as well as just and generous to a great degree; so that, in the beginning of the month *Ramadan*, he entertained the poor upon the flat roof of his house, and afterwards supplied the fowls of the air and wild beasts of the field with provisions of various kinds which he ordered his servants to leave upon the summits of the neighbouring mountains. The well which God shewed to Hagar in the wilderness is said to have been miraculously discovered to Abdal Motalleb, about 500 years after it had been filled up by Amru prince of the Jorhamites. This well is by the Arabs called *Zemzem*; which some derive from her calling to Ishmael, when she spied it, in the Egyptian tongue, *Zem, Zem*, i. e. Stay, Stay; though others ascribe it to a different origin. The water of this well, which is on the east-side of the Caaba, and covered with a small building and cupola, is highly revered; being not only drank with particular devotion by the pilgrims, but also sent in bottles as a great rarity to most parts of the Mahometan dominions.

Abdalla, the father of Mahomet, was a younger son of Abdal Motalleb; and so remarkable for his beauty, that several ladies of the tribe of Koreish fell desperately in love with him, and are said to have made the same attempt upon him that Potiphar's wife did upon Joseph. In his 24th or 25th year, he married Amana, the daughter of Wâheb, the son of Abdal Menâf. She is represented as the most beautiful, prudent, and virtuous lady of her tribe; and consequently the most worthy of such an extraordinary person as Abdalla. He died young, and, in his father's life-time, left his widow and infant son in very mean circumstances; his whole subsistence consisting only of five camels, and one female Ethiopian slave. Abdal Motalleb was, therefore, obliged to take care of his grandson Mahomet; which he not only did during his life, but at his death enjoined his eldest son Abu Taleb to provide for him for the future. Abu Taleb was extremely kind to his nephew, and instructed him in the business of merchandise; for which purpose, he took him into Syria when he was but 13 years of age, recommending him to Khadijah, a noble and rich widow, for her factor; in whose service he behaved so well, that she married him, and thus raised him to an equality with the richest in Mecca.

Though Mahomet had probably formed a design of introducing his new religion pretty early, he did not think proper to avow it till the 40th year of his age. The grand article of his faith was, the unity of the divine nature, which he pretended was violated by the Jews and Christians no less than by the Pagans; for which reason, he resolved to make an attempt to rescue the world from the ignorance and superstition which prevailed at that time. This reformation he intended should begin in his own family; and therefore, having retired with his household to a cave in Mount Hara,

near Mecca, he there opened the secret of his mission to Khadijah; acquainting her that the angel Gabriel had just appeared to him, and told him that he was appointed the Apostle of God. He also repeated to her a passage which he said had been revealed to him by the ministry of the angel, with an account of many prodigies which happened at his birth*. This pretended revelation was received by Khadijah with the greatest joy; and in a kind of ecstasy he immediately communicated the good news to her cousin Waraka Ebn Nawfal, who, being a Christian, could write in the Hebrew character, and was pretty well versed in the Scriptures both of the Old and New Testament. He very readily came into her opinion, swore by God that what she said was true, and that "Mahomet was the great prophet foretold in the law by Moses the son of Amram."

Mahomet finding his first step so successful, as Waraka was a very considerable person, began to entertain great hopes of accomplishing his design. He next converted his servant Zeid, to whom he gave his liberty on the occasion, which afterwards became a rule to his followers; and then Ali the son of Abu Taleb, though at that time only nine or ten years of age. This last, however, making no account of the other two, he used to call the *first of believers*. The next person he applied to was Abu Becr, a man of very considerable authority among the Koreish. He was easily gained over, and by his influence several others, so that Mahomet now made his mission no longer a secret. To Abu Becr he gave the name of *Al Saddik*, or the faithful witness; because he not only vouched for every thing he said, but also greatly increased the number of his followers. Mahomet likewise complimented him with the title of *Atik*, or preserved; intimating thereby that he was certainly saved from hell-fire.

Having given out that he was commanded from heaven to admonish his near relations, Mahomet directed Ali to prepare an entertainment, and invite to it the sons and descendants of Abdal Motalleb. He intended to open his mind to them; but Abu Laheb, one of Mahomet's uncles, making the company break up before the prophet had an opportunity of speaking to them, he was obliged to invite them again the next day. Having now proposed the matter, he asked which of them would become his wazir, prime minister, or viceregent. This was accepted by Ali; upon which Mahomet said to him, "This is my brother, my deputy, and my (*khalif*) successor, or vicar; therefore shew yourselves submissive and obedient to him." At this speech all the company fell a-laughing, telling Abu Taleb that he must now pay obedience and submission to his own son. Notwithstanding this repulse, however, Mahomet was so far from being discouraged, that he began to preach to the people in public. They heard him with some patience till he began to upbraid them with the idolatry, obstinacy, and perverseness of themselves and their fathers; which so highly provoked them, that they openly declared themselves his enemies, except some few who were converted. The prophet was now protected by the authority of his uncle Abu Taleb; who, however, was earnestly solicited to persuade his nephew to desist, and at last threatened with an open rupture in case he could not prevail on him so to do. This had such an effect upon Abu Taleb, that he advised

Arabia.

* See Mahomet.

29 Converts his wife and cousin, &c.

26 Well Zemzem discovered by Abdal Motalleb.

27 Mahomet first a merchant.

28 Begins to broach his doctrine.

30 Rejected by the Koreish.

Arabic.

Arabic.

31
This resolution.

advised his nephew not to push the matter any further; representing the great danger he and his followers would otherwise run: but our prophet was not to be so intimidated; and told his uncle plainly, that "if they set against him the sun on his right hand, and the moon on his left, he would not abandon his enterprise." Abu Tâleb, therefore, finding him so firmly resolved, used no further arguments, but promised to stand by him to the utmost of his power: so that notwithstanding the people of his tribe came to a determination to expel both Mahomet and his followers, he found a powerful support in his uncle against all their machinations.

32
His followers persecuted.

Mahomet now entered upon his apostolic function with uncommon diligence and application; and soon gained over his uncle Hamza, and Omar Ebn Al Khattâb, a person very much esteemed, and who before had been his violent opposer. Notwithstanding this success, however, the Koreish continued their opposition, and came to a resolution to proscribe all who had embraced Mahomet's doctrine. In consequence of this resolution, the *Moslems*, as his followers were called, were now treated with such severity, that they found it no longer safe to continue in Mecca; nay, several of them in the fifth year of his mission found themselves obliged to fly into Ethiopia, where they were kindly received by the Najashi or king of that country, who refused to deliver them up to those whom the Koreish sent to demand them. At this refusal they were exasperated, that they came to a resolution to suppress effectually the new religion which had now made a considerable progress. In order to this, they entered into a solemn league or covenant against the Hâhemites, and the family of Abdal Motalleb in particular, engaging themselves to contract no marriages with them, nor to have any manner of communication with them otherwise; and, to give this the greater weight, they reduced it into writing, and laid it up in the Caaba. Upon this, the tribe became divided into two factions; and all the family of Hâsem, both Moslems and unbelievers, repaired to Abu Tâleb as their head; except only Abdal Uzza, surnamed Abu Lahab, the son of Abdal Motalleb, who, out of hatred to his nephew and his doctrine, went over to the opposite party. After this the authority of Abu Tâleb was scarce sufficient to protect Mahomet from the fury of the Koreish; who, according to Al Jannabi, made frequent attempts upon him; sometimes endeavouring to destroy him by force, at other times by secret wiles and machinations: nay, to compass their end, he tells us that they had recourse to magic, incantments, and diabolical illusions. In short, they gave him at last so much trouble, that he was obliged to change his habitation, and seek a new asylum for himself and his companions. This he found in the house of one Orkam, which was advantageously situated on a hill called *Safa*. Here he converted Orkam's family, and the house was afterwards held in high estimation by the Moslems.

33
The Koreish enter into a league against him.

34
Their writing a story by a rm.

The two factions into which the tribe of Koreish was divided subsisted for five years, when they were put an end to by a very strange accident. Mahomet told his uncle Abu Tâleb, that God had manifestly shewed his disapprobation of the covenant entered into against them, by sending a worm to eat out every word of the instrument except the name of God. With

this particular Abu Tâleb immediately acquainted the Koreish; offering, in case it proved false, to deliver up his nephew to them; but if it should prove true, he insisted that they ought to lay aside their animosity, and annul the league they had made against the Hâhemites. To this they acquiesced; and going to inspect the writing, found it to be as Abu Tâleb had told them; the words "In thy name O God," being the only ones which remained. On so remarkable a proof of the divine displeasure, the league was immediately annulled, and all acts of hostility between the two parties ceased.

After this memorable event Mahomet remained with his uncle Abu Tâleb, who survived the reconciliation only about eight months. The same year also died Khadijah, Mahomet's wife. Her death, as well as that of his uncle, proved a great detriment to his affairs; for the Koreish, notwithstanding the former reconciliation, began now to persecute him with more violence than ever. He was therefore obliged to fly for shelter to Al Tayef; which he chose on account of its being the residence of his uncle Al Abbâs, whose protection he imagined he would be able to secure. In this, however, he found himself mistaken; and though he staid a month in the city, during which time he gained over a few, yet at last the lower sort of people rose against him and obliged him to return to Mecca. This refusal, though it greatly discouraged the new converts, did not in the least abate the zeal of Mahomet: on the contrary, he continued to preach boldly to the public assemblies at the pilgrimage to Mecca, exclaiming against idolatry, and particularly against the worship of two idols Allat and Al Uzza, to which the tribes, especially the women of that of Thakif, were very much addicted. By this the prophet was often exposed to great danger: however, he gained some converts, and amongst them fix of the inhabitants of Yathreb, of the Jewish tribe of Khazraj; who, on their return home, failed not to speak much in commendation of their new religion, and exhorted their fellow-citizens immediately to embrace it. These converts of the tribe of Khazraj are by the Arab writers called *Al Anfar*, *Al Anfarîi*, or *Anfarî*; that is, assistants, favourers, supporters, &c. because they assisted and supported the prophet when he was pursued to the very brink of destruction. They first met Mahomet on a little hill called *Al Akaba*, where a temple stood, and where they first took an oath to exert themselves in support of their new apostle and his religion. An uninterrupted friendship and harmony reigned for a long time amongst the members of the Jewish tribes of Khazraj, Koreidha, and Nadir, whose great progenitor, say the Arabs, was Aaron the son of Amran. Mahomet therefore insinuating himself into the good graces of the Anfars, they readily embraced his religion, and proved of very considerable service.

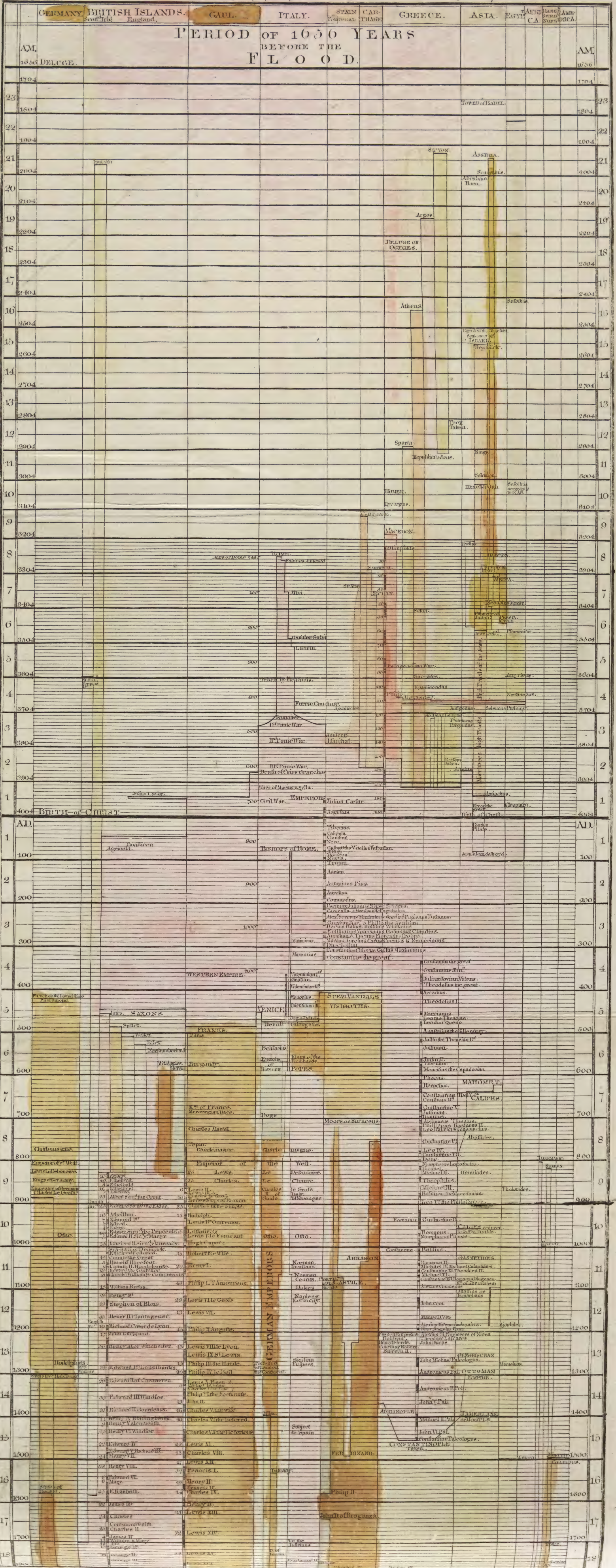
36
Anfars, who

The next remarkable thing recorded of Mahomet is the invention of his night-journey to heaven. This he probably intended to supply the place of miracles; which, being performed by all other prophets, would no doubt have been considered as a capital defect in Mahomet's mission, had they been totally wanting. The absurdities contained in that relation, however, are so great, that when he related it to his uncle Al Abbâs, and Omm Hâna the daughter of Abu Tâleb, they endeavoured

35
Mahomet still persecuted by the Koreish.

37
Mahomet's journey to heaven.

Representing at one View the rise and progress of the Principal States & Empires of the known World.



Arabia.

deavoured to dissuade him from making it public. This advice he was so far from following, that he related the whole to Abu Jahl, one of his most inveterate enemies, who ridiculed him for it. Nay, he placed this story in such a ridiculous light to the Koreish, that they were on the point of insulting him; several of his followers left him; and the whole design had probably been ruined, had not Abu Beer vouched for his veracity, and declared, that, if Mahomet affirmed it to be true, he firmly believed the whole. This happy incident not only retrieved the prophet's credit, but increased it to such a degree, that he was sure of making his disciples swallow whatever he pleased; and on this occasion it is said by some that he gave Abu Beer the name of the *faithful witness*, as we have already related.

In the twelfth year of Mahomet's mission, twelve men of Yathreb, or Medina, of whom ten were of the tribe of Kharai, and two of that of Aws, came to Mecca, and took an oath of fidelity to the prophet at the hill Al Akaba. When they had solemnly engaged to do all required of them, Mahomet sent one of his disciples, named *Masab Ebn Omair*, home with them, to instruct them more fully in the grounds of their new religion. Masab being arrived at Medina, with the assistance of the new proselytes, gained several others; and acquainting Mahomet with the success of his mission, desired leave to form a congregation of Moslems at Medina. This the prophet readily granted; in consequence of which, the new Moslems regularly assembled, to the number of forty persons, in the house of Saad Ebn Khaithama. The next year Masab returned to Mecca, accompanied by seventy-three men and two women of Medina, who had professed Mahometanism, besides several others who were yet unbelievers. On their arrival they sent immediately to Mahomet, and offered him their assistance, of which he now stood in the greatest need; for his adversaries were by this time grown so powerful in Mecca, that he could not stay there much longer without imminent danger. He therefore accepted their proposal, and met them one night by appointment at the hill Al Akaba. At this interview he was attended by his uncle Al Abbas; who, though then an unbeliever, wished his nephew well, and made a speech to the people of Medina, wherein he told them, that as Mahomet was obliged to quit his native city and seek an asylum elsewhere, and as they had offered him their protection, they would do well not to deceive him; and if they were not firmly resolved to defend, and not to betray him, they had better declare their minds, and let him seek for protection somewhere else. Upon their protesting their sincerity, Mahomet swore to be faithful to them, a part of the Koran being read to all present, on condition they should protect him against all insults, as heartily as they would do their own wives and families. They then asked him what recompence they were to expect if they should happen to be killed in his quarrel: he answered, Paradise; upon which they pledged their faith to him, after Mahomet had chosen twelve out of their number, who were to have the same authority under him that the twelve apostles had under Christ.

Finding now a confederacy formed in his favour, our prophet began to pull off the mask as to his true sentiments concerning the means of reformation. Hi-

therto he had propagated his religion by fair means only; and in several passages of the Koran, which he pretended were revealed before this time, he declared, that his business was only to preach and admonish; that he had no authority to compel any person; and that whether they believed or not, was none of his concern, but belonged solely to God. But no sooner did he find himself enabled, by the alliance abovementioned, to resist his enemies, than he gave out that God had allowed him and his followers to defend themselves; and at length, as his forces increased, he pretended not only to have leave to act on the defensive, but to attack the infidels, destroy idolatry, and set up the true religion by the power of the sword. To this he was excited by an apprehension that pacific measures would greatly retard, if not entirely overthrow, his designs; and therefore he determined to use the most violent methods to convert the Pagan Arabs, or rather to extend his own authority.

The Koreish, in the mean time, finding that Mahomet had considerably extended his influence, and hearing of the league concluded with the Ansars, began to think it absolutely necessary that he should be prevented from escaping to Medina; and, in order to do this the more effectually, they resolved in a council, wherein it is said the devil assisted in person, to put an end to his life. To accomplish this with the greater safety, they agreed that a man should be chosen out of every tribe, and that each should have a blow at him; that so the guilt of his death might fall equally on all the tribes, and thus the Hashemites would be prevented from attempting to revenge the death of their kinsman, as they were much inferior in power to the rest of the tribes put together. Mahomet now directed his companions to repair to Medina, where, in consequence of the late treaty, they might be assured of protection. This they accordingly did: but he himself, with Abu Beer and Ali, remained behind; not having received, as he pretended, the divine permission to retire. Here he narrowly watched the motions of the Koreish, and was soon apprised of their machinations; for the above-mentioned conspiracy was scarce formed, when by some means or other it came to Mahomet's knowledge; and he gave out that it was revealed to him by the angel Gabriel, who also commanded him to retire from Mecca. The conspirators were already assembled at the prophet's door; but he, to amuse them, ordered Ali to lie down in his place, and wrap himself in his green cloak: this Ali complied with, and Mahomet miraculously, according to the Arabs, escaped to the house of Abu Beer. The conspirators, in the mean time, perceiving through a crevice Ali wrapped up in the green cloak, took him for Mahomet himself, and watched there till morning, when Ali awoke, and they found themselves deceived. The prophet next retired in company with Abu Beer to a cave in mount Thûr, an hill a little south of Mecca. Here he had still a more narrow escape, concerning which we have the following account from an Arabic tradition. "The Koreish having detached a party from Mecca to reconnoitre the mouth of the cave, when they came there, found it covered by a spiders web, and a nest built at the entrance by two pigeons which they saw, and which had laid two eggs therein. On sight of this they reasoned with themselves in the following manner:

Arabia

40
The Koreish resolve to put Mahomet to death.

41
He outwitted them and escapes.

42
In great danger at mount Thûr.

38
Almost proves the ruin of his cause.

39
Congregation of Moslems formed at Medina.

Arabia.

Arabia

ner: "If any person had lately entered this cavern, the eggs now before us would infallibly have been broke, and the spider's web demolished; there can therefore be no body in it;" after which, they immediately retired. As the prophet, therefore, and his friend, were now faved by miraculously, by means of the pigeon's eggs and the interposition of the spider's web, he afterwards enjoined his followers, in memory of so remarkable an event, to look upon pigeons as a kind of sacred animals, and never to kill a spider."

43
He is pursued and overtaken, but still escapes.

The prophet and Abu Beer having staid in this cave three days in order to recover a little from their consternation, set out for Medina; but the Koreish, being informed of the route they had taken, sent a party after them, under the command of Soraka Ebn Malec. These overtook them; and, as the Arab historians tell us, Soraka's horse fell down when he attempted to seize Mahomet. Upon this he recommended himself to the prophet's prayers, and remounted his horse without hurt: but, as he still continued the pursuit, his horse fell down with him a second time; upon which he returned to Mecca, without offering any further violence; and Mahomet, thus happily delivered from the greatest dangers, arrived without further molestation at Medina, where he was received with the greatest demonstrations of joy.—This flight of the prophet from Mecca to Medina was reckoned so remarkable by the Moslems, that they made it the *æra* from whence all their remarkable transactions were dated; calling it the *Æra of the Hegira*, or flight. The beginning of the Hegira corresponded with the 16th of July, A. D. 622.

44
Æra of the Hegira.

On Mahomet's arrival at Mecca, his first care was to build a mosque for his religious worship, and an house for himself. The city of Medina at that time was inhabited partly by Jews, and partly by heretical Christians, that formed two factions which persecuted one another with great violence. This gave the impostor such an opportunity of propagating his new religion, that in a short time the city was entirely at his devotion. Here he strengthened himself by marrying Ayesha the daughter of Abu Beer, though then only seven years of age, and gave his own daughter Fatima in marriage to Ali the son of Abu Taleb. The next point he had in view was the union of the Mohâjerin, or those who fled from Mecca on account of their religion, with the Ansars above mentioned. To facilitate this, after his mosque and house were finished, he established among the Moslems a fraternity, the principal statute of which was, that they should not only treat one another like brethren, but likewise most cordially love and mutually cherish one another to the utmost of their power. But, lest even this should prove insufficient, he coupled the individuals of the two bodies of Ansars and Mohâjerin; and this was the last transaction of the first year of the Hegira.

45
Union of the Ansars and Mohâjerin.

The next year was ushered in, according to Abulfeida, with a change of the *Kelba*, or place whither the Mahometans were to turn their faces in prayer. At first it had been declared to be perfectly indifferent where they turned their faces. Afterwards he directed them to pray with their faces towards the temple of Jerusalem, probably with a view to ingratiate himself with the Jews; and now, in order to gain the Pagan Arabs, he ordered his followers to pray with their faces towards the east. This inconsistency gave great of-

fence, and occasioned the apostacy of many of his disciples. About this time Mahomet receiving advice that a rich caravan of the Koreish was on the road from Syria to Mecca, he detached his uncle Hamza, at the head of 30 horse, to seize upon it; who accordingly lay in wait for it in one of the woods of Yamama, thro' which it was to pass: here, however, he was informed that the caravan was guarded by 300 men, so that he returned without making any attempt; but the prophet made the proper dispositions for acting hereafter against the Koreish with success. This year also Mahomet sent out a party of 60 or 80 horse, all Mohâjerin, except one who was an Ansar, to make reprisals on the Koreish. They were met by a party of their enemies, and both sides immediately prepared for an engagement: however, they parted without bloodshed, except one of the Koreish, who was killed by an arrow shot by one of the Moslems.

46
Mahomet takes a caravan, and gains the battle of Bedr.

Mahomet, having now put himself into an offensive posture, began in earnest to make reprisals on the Koreish. His first exploit was the taking of a caravan attended by a small guard; and this being accomplished by a party consisting only of nine men, contributed greatly to encourage the Moslems. But what most established the impostor's affairs, and was indeed the true foundation of all his future greatness, was his gaining the battle of *Bedr*, of which we have the following account.—The prophet being informed that Abu Sofian Ebn Harb escorted a caravan of the Koreish with only 30 or 40 men, resolved to advance at the head of a small detachment of his troops to intercept it. To this he was excited by the riches of the caravan, which consisted of a large quantity of merchandise, consisting of the riches of Syria, carried on the backs of a thousand camels. He therefore sent out a party to reconnoitre it, with orders to wait in some convenient place, where they might remain undiscovered. But Abu Sofian having notice of Mahomet's motions, dispatched a courier to Mecca, requesting succours from his countrymen, that he might be able to defend the caravan. Upon this Mahomet drew together all his forces, which amounted to no more than 313; while his enemies consisted of very near 1000, Abu Sofian having been reinforced by the Meccans with 950 men. The two armies did not long remain in a state of inaction: but before the battle three champions from each party engaged each other in single combat. In this the Moslem champions were victorious, and the event greatly discouraged the Koreish. Mahomet, in the mean time, taking advantage of this lucky event, offered up his prayers to God with great fervency and vehemence; after which, feigning himself in a trance, he pretended that God had assured him of victory. Then, throwing an handful of dust or gravel towards the enemy, he cried out, "May the faces of them be confounded;" and attacked the Koreish with such bravery, that they were soon put to flight, leaving 70 dead on the spot, and having as many taken prisoners. The loss on Mahomet's side was only 14 men, and among the prisoners was Al Abbas the prophet's uncle.

Though this action may seem of little consequence in itself, it was of very great advantage to Mahomet's affairs at that time. He was immediately treated with the highest respect by the Najashî, or king of Ethiopia,

Arabia.

phia, who received a particular account of the victory soon after it was gained; while the superstitious Moslems did not fail to look upon it as an evident declaration of heaven in their favour. Nay, notwithstanding the small number of enemies to be overcome, and who were only mortal men, these ignorant bigots did not hesitate to own the assistance of no less than four thousand angels, who, according to them, rode on black and white horses, having on their heads white and yellow falshes, that hung down between their shoulders!

Notwithstanding this disaster, however, Abu Sofian made a pretty good retreat, and conducted the greatest part of the caravan to Mecca. This chagrined the Moslems, though they found great spoils on the field of battle, the division of which had likely to have proved fatal to their cause, by the quarrels that it occasioned among them. So hot, indeed, were the disputes on this occasion, that the impostor was obliged to pretend an immediate revelation from heaven, empowering him to retain a fifth part for religious purposes, and to distribute the rest equally. This became a law for his successors; but, with regard to himself, the prophet often took the liberty of infringing it; for which, no doubt, a new revelation was always a ready and convenient salvo. As for those who were slain on Mahomet's part in this battle, they were all looked upon by the Moslems as martyrs; and the prophet perceiving among the prisoners two of his inveterate enemies, immediately caused their heads to be struck off.

The Koreish, in order to be revenged on Mahomet for their late defeat at Bedr, sent Amru Ebn Al As, who afterwards conquered Egypt, with some other of their principal people, on an embassy to the king of Ethiopia, in order to interest him in their quarrel. To do this the more effectually, they accused Mahomet and his followers of speaking disrespectfully of Jesus, and of his mother MARY; which accusation they hoped would likewise induce him to deliver up the Moslem refugees that were then at his court. But the bad success that had attended the arms of the Koreish hitherto, joined to the excuses made by the refugees, not only hindered the Najashi from delivering them up, but also prompted him to dismiss the ambassadors, and return the presents they had brought him. In the mean time, Abu Sofian, who had sworn never to use perfumes or enjoy women till he had another battle with Mahomet, set out from Mecca with a body of two hundred horse. He advanced to a post within three miles of Medina; from whence he sent a detachment, who burnt a barn, together with a man in it that was winnowing wheat. Mahomet, being informed of this outrage, moved immediately towards him with a detachment of cavalry; but Abu Sofian was so intimidated by his approach, that he fled with precipitation, leaving behind him all the sacks of flower or meal that had been brought for the subsistence of his troops. Instead therefore of coming to an engagement with the impostor, as he had sworn, he contented himself with alarming the country, and pillaging such as he suspected of favouring Mahometanism.—This year also Mahomet conquered the tribes called *Banu Solaim*, *Ghatfan*, and the *Banu Kainoka*; plundering likewise a rich caravan belonging to the Koreish, and acquiring from thence 25,000 dirhems for his own share of the plunder.

47
His law concerning the division of spoils.

48
Abu Sofian's cowardice.

In the year of Christ 625, being the third of the Hegira, the Koreish assembled an army of 3000 men, among whom were 200 horse and 700 armed with coats of mail. The command of this army was given to Abu Sofian, who was attended by his wife Henda Bint Othba, and sat down at a village about six miles distant from Medina. Mahomet, being much inferior to the enemy, resolved at first to keep himself within the town, and receive them there; but afterwards, by the advice of his companions, marched out against them at the head of 1000, according to some, 1050 according to others, or, as some say, only 900 men. Of these 200 were cuirassiers; but he had only one horse besides his own in the whole army. He distributed three standards among his troops; of which one was given to the tribe of Awa, another to that of Khazraj, and the third to the Mohajerin. The grand standard was carried before the prophet by Mosaab Ebn Omair. With these forces Mahomet formed a Battle of camp in a village near Ohod, a mountain about four miles north of Medina, which he contrived to have on his back; and the better to secure his men from being surrounded, he placed 50 archers, the flower of his troops, in the rear, with strict orders not to quit their post. On the other hand, the army of the Koreish was drawn up in the form of a crescent, and made a very good appearance. The right wing was commanded by Khaled Ebn Al Walid, afterwards so terrible to the Greeks; the left by Acrema Ebn Abu Jahl; and the centre by Abu Sofian. The corps de reserve was headed by Abu Sofian's wife, accompanied by 15 other matrons, who performed the office of drummers, lamenting the fate of their countrymen slain at Bedr, in order to animate the troops who attended them. The attack was begun by the Moslems, who fell upon the enemy with such fury, that their centre immediately began to give way. Ali, or, according to Abulfeda, Hamza, slew Arta the enemy's great standard-bearer; which struck them with such terror, that they soon betook themselves to flight, falling foul upon their own corps de reserve. Victory had now been no longer doubtful, notwithstanding the vast inferiority of Mahomet's troops, had not the 50 archers, contrary to the prophet's express commands, quitted their post to pillage the enemy. Upon this, Khaled perceiving the Moslem army to be greatly exposed, attacked them in the rear with such bravery, that he turned the fortune of the day. Not content with putting the troops there in disorder, he cried out with all his might "Mahomet is slain;" and this had such an effect upon the Moslems, that they immediately took to their heels, nor could the utmost endeavours of the prophet himself afterwards rally them. He therefore found himself obliged to quit the field of battle, in doing which he was very near losing his life; being struck down by a shower of stones, and wounded in the face by two arrows, which occasioned the loss of two of his fore-teeth. He likewise received a contusion on his upper lip; and had even been killed on the spot, had not one of his companions, named Telha, Abu Becr's nephew, received a blow that was levelled at him. On this occasion Telha received a wound in his hand, which deprived him ever after of the use of some of his fingers. Of the Moslems 70 were slain; among whom were Hamza the prophet's uncle, and Mosaab the

Arabia.

49
Battle of Ohod.

50
Mahomet defeated.

Arabia.

the standard-bearer. Amongst the wounded were Abu Becr, Omar, and Othman; but as soon as they understood that the prophet was safe, they returned to the charge with a considerable body, and, after an obstinate dispute, carried him off. The good retreat made by these champions so discouraged the troops of Abu Sofian, that they did not pursue the flying enemy, but contented themselves with remaining masters of the field of battle; nor did that general, tho' he exulted not a little in his victory, make any further use of it than to give Mahomet a challenge to meet him the next year at Bedr, which was accepted; and after his return to Mecca, he desired a truce with the Moslems, which was readily granted.

54
He apologizes for his defeat.

This defeat had like to have proved the total ruin of the impostor's affairs, and must inevitably have done so had the conquerors made the least use of their victory. Some of his followers now asserted, that, had he been really a prophet sent from God, he could not have been thus defeated; and others were exasperated on account of the loss of their friends and relations who had been slain in the late engagement. To still the murmurs of the former, he laid the blame on the sins of those who had accompanied him; and, to pacify the latter, he pretended a revelation from heaven, wherein the period of all mens lives was said to be unalterably fixed without regard to their own actions, or to any external objects; so that those who were killed in battle behaved to have died, though they had remained at home in their own houses. By the assistance of this last doctrine he encouraged his followers to fight, without fear, for the propagation of their faith, as all their caution would not be sufficient to avert their destiny, or prolong their lives even for a single moment.

55
Siege of Medina.

The next year, (A. D. 626), Mahomet, besides several other less considerable successes, reduced a fortress belonging to the Jewish tribe of Al Nadir, who had revolted on account of the defeat at Ohod: on this occasion, by an express revelation, as he pretended, he kept the whole booty to himself; and, about the same time, forbade his followers the use of wine, or to play at games of chance, on account of the disturbances and quarrels which were likely to be excited by that means among them. This year also he marched with a body of infantry to Bedr, to meet Abu Sofian, as he had promised the year before: but that general's heart failing him, he returned home without facing the prophet; and this piece of cowardice the Moslems did not fail to impute to a terror felt immediately from God. The year following, however, the Koreish, in conjunction with the tribe of Ghatfan, and the Jews of Al Nadir and Koreidha, assembled an army of 12,000 men, with which they formed the siege of Medina; thus threatening the impostor and all his followers with utter destruction at once. On the enemies approach, Mahomet, by the advice of a Persian named *Salman*, ordered a deep ditch to be dug round the city, and went out to defend it with 3000 men. The Arabs having invested the town, both sides remained in a state of inactivity for some time, which was so well employed by the impostor, that he found means to corrupt some of the leading men in the enemy's camp. The good effects of this soon appeared; for a champion having advanced to the Moslem entrenchments, and challenged the best man in their army to fight him in single combat,

the challenge was immediately accepted by Ali, who slew him and another that came to his assistance: after which, those who had been corrupted by Mahomet's agents so soured a considerable part of the forces, that they deserted their camp; upon which all the rest were obliged to raise the siege, and return home.

Arabia.

53
The siege raised.

The prophet, being now happily delivered from the most powerful combination that had ever been formed against him, was visited by the angel Gabriel; who asked him whether he had suffered his men to lay down their arms, when the angels had not laid down theirs, ordering him at the same time to go immediately against the tribe of Koreidha, and assuring him that he himself would lead the way. Upon this, Mahomet immediately set out for the fortresses of the Koreidhites, and pushed on the siege with so much vigour, that, tho' it was deemed impregnable, he obliged the garrison to capitulate in twenty-five days. The Koreidhites, not daring to trust themselves to the impostor's mercy, surrendered at discretion to Saad Ebn Moadh, prince of the tribe of Aws, hoping that he, being one of their old friends and confederates, would have some regard for them. Here, however, they found themselves disappointed; for Saad, being highly provoked at them for assisting the Koreish, while in league with Mahomet, ordered the men to be put to the sword, the women and children made slaves, and their goods divided among the Moslems. This sentence was no sooner heard by Mahomet, than he cried out that Saad had pronounced the sentence of God; and, in consequence of this decision, ordered the men, to the number of 600 or 700, to be immediately massacred. The women and children were also carried into captivity. Their immovable possessions were given to the Molajerin, and the goods divided equally.

54
Koreidhites massacred.

Mahomet now continued to be successful, gradually reducing the Arab tribes one after another. In 628, he sent an agent to Constantinople, desiring leave of the Greek emperor to trade with his subjects; which was immediately granted. The same year also he concluded a peace for ten years with the inhabitants of Mecca, and obtained liberty the next year to perform his devotions at the Caaba. What tended considerably to bring about this pacification was an account brought to the Koreish by one whom they had sent with an actual defiance to Mahomet, of the prodigious veneration which his followers had for him. This messenger acquainted them that he had been at the courts both of the Roman emperors and of the kings of Persia, but never saw any prince so highly respected as Mahomet was by his companions. Whenever he made the ablution, in order to say his prayers, they ran and caught the water which he had used; whenever he spit, they licked it up, and gathered up every hair that fell from him, with great veneration. This intimated how desperately they would fight in his defence, and probably inclined his enemies to avoid hostilities. In 629, the impostor began to think of propagating his religion beyond the bounds of Arabia, and sent messengers to several neighbouring princes to invite them to embrace Mahometanism; but, before sending the letters, he caused a silver seal to be made, on which were engraved in three lines the following words, "MAHOMET THE APOSTLE OF GOD." This seal, he believed, would procure the letters to which it was affixed a more fa-

55
Prodigious veneration in favour of Mahomet.

56
He invites foreign princes to embrace his religion.

Arabia.

yourable reception at the courts of those princes whither they were directed. The first to whom he applied was Khofru Parviz the king of Persia; but he, finding that Mahomet had put his own name before his, tore the letter in pieces, and sent away the messenger very abruptly. He also sent a letter to the same purpose to Constantinople; but though the emperor Heraclius dismissed his messengers honourably, he refused to abandon the Christian faith. Besides these, he wrote five other letters, which he distributed among those who he thought would be most likely to acknowledge him for an apostle. However, we do not hear, that by means of letters he ever introduced his religion into a foreign country.—

57
Is poisoned,
but recovers.

But while our impostor was thus going on in the full career of success, and industriously propagating his infamous falsehoods by all the means he could think of, he was poisoned by a maid, who wanted, as she said, to make an experiment whether he was a prophet or not. This was done by communicating some poison to a shoulder of mutton, of which one of his companions named *Bahar Ebn Al Bara*, eating heartily, died upon the spot; and Mahomet himself, though he recovered a little, and lived three years after, yet never enjoyed perfect health. Notwithstanding this misfortune, however, he still continued his enterprizes. The year 630 proved remarkably fortunate. It was ushered in by the conversion of Khalid Ebn Al Walid, Amru Ebn Al As, and Othman Ebn Telha, three of the most considerable persons among the Koreish; and this soon enabled him to become master of the whole peninsula of Arabia. This year also the inhabitants of Mecca took it into their heads to violate the treaty concluded with Mahomet: for the tribe of Becr, who were the confederates of the Koreish, attacking those of Khozaab, who were in alliance with Mahomet, massacred 20 of them, and afterwards retired; being supported in this action by a party of the Koreish themselves.—The consequence of this violation was soon apprehended; and Abu Sofian himself made a journey to Medina, in order to heal the breach, and renew the truce: but in vain; for Mahomet, glad of this opportunity, refused to see him. Upon this, he applied to Abu Becr, Ali, Omar, and Fatima, to intercede for their countrymen with the prophet; but some of these giving him rough answers, and others none at all, he was obliged to return to Mecca as he came. Mahomet immediately gave orders for the necessary preparations, that he might surprise the Meccans, who were by no means in a condition to receive him; but Hateb Ebn Abu Balta'a, hitherto a faithful Moslem, attempted to give them notice of their danger by a letter, though without effect. His letter was intercepted; and he alleged in his excuse, that the only reason he had for his conduct was to induce the Koreish to treat his family with kindness. This excuse the prophet accepted, as he had greatly distinguished himself at the battle of Bedr, but strictly forbade any such practices for the future; which having done, he immediately made the necessary dispositions for setting forward.

Mahomet's army, on this occasion, was composed of Mohajerin, Ansars, and other Arabs, who had lately become proselytes. As they drew near to Mecca, he set up his standards, and advanced in order of battle to Mar Al Dhahrân, a place about four parasangs from Mecca, where the whole army encamped. Here he

ordered 10,000 fires to be lighted, and committed the defence of the camp to Omar, who cut off all communication with the town, so that the Meccans could receive no certain advice of their approach. Among others that came from Mecca to reconnoitre the Moslem camp, Abu Sofian Ebn Harb, Hakim Ebn Hazam, and Bodail Ebn Warka, fell into Omar's hands; and being conducted to Mahomet, were obliged to embrace Mahometanism in order to save their lives.

The first rumour of this expedition had not a little terrified the Koreish, though they were not apprized that the prophet had resolved upon a war; but perceiving now, upon the report of Abu Sofian, who had been sent back to them, that the enemy was at their gates, they were thrown into the utmost consternation. Of this Mahomet being informed, he resolved to take advantage of the confusion that then reigned among them. He therefore first dispatched Hakim and Bodail to the Meccans, inviting them to take an oath of allegiance to him, and become converts to his new religion; after which, he made the following disposition of his forces. Al Zobcir was ordered to advance with a detachment towards the town on the side of mount Coda. Saad Ebn Obad, prince of the tribe Khazraj, marched by his order with another detachment towards the height of Coda, which commands the plain of Mecca. Ali commanded the left wing of the army, consisting of Ansars and Mohajerin. The prophet put into his hands the great standard of Mahometanism, with orders to post himself upon mount Al Hajun, and to plant the standard there; strictly enjoining him, however, not to stir from thence till he himself arrived, and till a proper signal should be given him from Saad for that purpose. Khaled led the right wing, consisting of the Arabs lately converted, with which he was to possess himself of the plain of Mecca. Abu Obeidah commanded in the centre, which consisted entirely of infantry: the prophet himself remained in the rear, from whence he could most easily dispatch his orders to all the generals as occasion should require. He expressly prohibited Khaled and all his other officers to act offensively unless they were first attacked. Things being in this situation, the army upon a signal given put itself immediately in motion. The prophet mounted his camel with great alacrity, and was that day clothed in red. Al Zobcir pursued the route assigned him without opposition; nor did Saad discover the faintest traces of an enemy: Ali took possession of his post without the loss of a man; and in like manner Abu Obeidah seized on the suburbs. Khaled, however, in his march to the plain, was met by a large body of the Koreish and their confederates, whom he immediately attacked and defeated, putting 28 of them to the sword. Not content with this, he pursued them into the town, and massacred a great number of the inhabitants; which so terrified the rest, that some shut themselves up in their houses, while others fled different ways in order to avoid the fury of the mercileless and impious tyrant, who was now become master of the city. Thus was Mecca reduced, with the loss only of two men on the side of the impostor.

Mahomet, being now master of the city, made his public entry into it exactly at sun-rising. When the first tumult was over, he went in procession round the Caaba seven times, touching the corner of the black stone with

Arabia.

58
Meccans
violate the
treaty with
Mahomet.

59
Mecca taken.

the

Arabia.

the staff in his hand, as often as he passed it, with great devotion. Then he entered the Caaba, where observing several idols in the form of angels, and the statues of Abraham and Ishmael with the arrows of divination in their hands, he caused them all to be destroyed. He also broke in pieces with his own hands a wooden pigeon, that had long been esteemed a deity by the idolatrous Koreish. Afterwards entering into the interior part of the Caaba, he repeated with a loud voice the form used at this day by the Mahometans, "Allah Akbar, God is Great," &c. turning towards every part of the temple. Then he prayed between the two pillars there, with two inclinations, as well as without the Caaba; saying to those that attended him, "This is your Kebra, or the place towards which you are to turn your faces in prayer."

Having thus effectually subdued the Koreish, put an end to all commotions, and purged the Caaba of 360 idols, the prophet's next care was to ingratiate himself with the people. Sending therefore for some of the principal of them, he asked them what kind of treatment they expected from him, now he had conquered them? To this they replied, "None but what is favourable, O generous brother;" upon which he dismissed them, telling them they were from that moment a free people. After this, pretending a new revelation, he restored the keys of the Caaba to Othman Ebn Tolha, who was in possession of them before; and who was now so much affected by this piece of justice, that he immediately became a profelyte. Next day, the prophet declared Mecca an asylum, and publicly gave out that he would maintain to the utmost of his power the inviolable security of the place. He then was solemnly inaugurated; after which he proscribed, according to some, six men and four women, according to others, eleven men and one woman: but of these only three men and one woman were put to death; the rest being pardoned on their embracing Mahometanism, and one woman making her escape. The remainder of this year was spent in various expeditions against different tribes of the Arabs, which were in general attended with success.

The ninth year of the Hegira, being that of Christ 631, is called by the Mahometans the year of *Embassies*; for the Arabs, who had hitherto been expecting the issue of the war between Mahomet and the Koreish, no sooner saw that which was the most considerable of the whole submit to him, than they began to come in to him in great numbers, and to send embassies to make their submissions to him, both while at Mecca, and after his return to Medina, whither he had returned soon after the taking of Mecca: and thus good fortune continued without interruption to the year 632, when this famous impostor breathed his last, having just reduced under his subjection the whole peninsula of Arabia, and being ready to break into the neighbouring kingdoms in order to satisfy his ambition.

The death of Mahomet occasioned such a consternation in Mecca, that the governor hid himself, fearing to be called to an account for his former conduct; and the inhabitants, upon the first arrival of this melancholy news, considered themselves as destitute of all manner of protection. After the first impressions of their fear, however, were over, they began to meditate a revolt; but were prevented by one Sahl Ebn Amru, a prin-

cipal man of the Koreish. The tumults at Medina, however, were not so easily appeased. The news of this sad event was no sooner published there, than a number of people assembled before his door, crying out, "How can our apostle be dead? Our intercessor, our mediator, has not entirely left us! He is taken up into heaven, as was Isa (Jesus); therefore he shall not be buried." This was confirmed by Omar; who drew his sword, and swore, that, if any person affirmed Mahomet to be dead, he would cut off his hands and his feet. "The apostle of God, says he, is not dead: he is only gone for a season, as Moses the son of Amran was gone from the people of Israel for forty days, and then returned to them again." The populace therefore kept the body above ground, even after the belly began to swell; nor could the prophet's uncle Al Abbas, notwithstanding this, convince them to the contrary. Upon hearing of these transactions, Abu Beer immediately posted from Al Sonah, another quarter of the city, and expostulated with them in the following manner: "Do you worship Mahomet, or the god of Mahomet? If the latter, he is immortal, and liveth for ever; but if the former, you are in a manifest error, for he is certainly dead." The truth of this assertion he immediately evinced from several passages of the Koran, in so clear and conclusive a manner, that he not only satisfied Omar, but calmed the minds of all the people.

The prophet having left no directions concerning a successor, very warm disputes arose between the Mohajerin and the Ansars about the right of electing a khalif. The former insisted on having that right, because they had attended Mahomet in his flight to Medina; and the others, because they had supported him when expelled from his native city, &c. In short, the disputes became so hot, that an open rupture must have commenced, had not they been terminated by a proposal that each party should chuse a khalif. This amused them a little for the present; but not proving perfectly agreeable to the Mohajerin, Abu Beer proposed two persons, Omar and Abu Obeidah, offering to swear allegiance to him on whom the suffrages of both parties should fall. But this producing no decision, Omar swore fealty to Abu Beer, and his example was followed by all the Moslems on the spot; upon which, he was acknowledged, both by the Mohajerin and Ansars, as the rightful successor of Mahomet.

These transactions, however, were not at all agreeable to Ali, who, as son-in-law to the prophet, had undoubtedly the best title to the succession. He expostulated with Abu Beer about the manner of his election, which had been effected without his knowledge; and received for answer, that the exigence of affairs would not admit of deliberation; and that, had not the election been so sudden, the opposite party would have wrested the power entirely out of their hands. Ali was in Fatima's apartment when Abu Beer had the good luck to be elected khalif; and, upon the arrival of the news, expressed great dissatisfaction. He found himself, however, soon obliged to change his note, when the new khalif sent Omar with orders to burn the house where he and his friends were assembled, in case he did not concur in supporting the election. But, notwithstanding his forced compliance on this occasion, it is not to be doubted that he reckoned himself injured; and his pretensions were thought to be just by a great number

Arabia.

62
Abu Beer
succeeds
him.

63
Ali dissatis-
fied.

60
Mahomet
dies.

61
Great con-
fusion on his
death.

Arabia.

ber of Moslems: which notion is entertained by a very considerable party of Mahometans even at this day; and these are called *Shiites*, or *sectaries*.

65
Rebellions
extinguish-
ed by Kha-
led.

Soon after Abu Becr's accession, many of the Arabs refused to pay the tribute imposed upon them by Mahomet, and even attempted to shake off his yoke altogether. This fo alarmed the khalif and his subjects at Medina, that, fearing a general revolt, they sent all not able to bear arms into the cavities of the rocks and mountains, and put themselves in as good a posture of defence as the short time would permit. In the mean time, Khaled was dispatched with an army of 4500 men, to reduce the rebels; and he soon coming up with them, gave them a total defeat, brought off a vast quantity of plunder, and made many of their children slaves. Nor was he content with this; for being sent by Abu Becr to Malec Ebn Nowairah, an eminent person among the Arabs, and famous for his skill in poetry, as well as his horsemanship and bravery, to bring him over by fair means, he immediately ordered his head to be cut off. By this means, indeed, he extinguished all the remains of rebellion; but rendered himself exceedingly obnoxious to Abu Becr, who would have put him to death, had not Omar strongly interceded for him: for Khaled had greatly exceeded his commission, as Malec had returned to Mahometanism, and had offered to pay the money. This was not, however, the only piece of service Khaled performed at this time; he also defeated and killed Moseilama, who had set up for a prophet in the time of Mahomet, and even wanted to take the grand impostor himself into company with him. The same general likewise defeated and dispersed the troops of another prophet, called *Toliah Ebn Khowailed*, obliging himself to remain concealed till after the death of Abu Becr. About the same time another body of rebels committed great disorders in the province of Bahrein. Against these, Abu Becr dispatched Al Ola at the head of a considerable army, who soon obliged them to return to Mahometanism; having put great numbers of them to the sword, and plundered their country in a dreadful manner.

5
War with
the Greeks.

Abu Becr having now no enemy to contend with in Arabia, and being free from all apprehensions of a competitor, resolved next to turn his arms against the Greek emperor. Some skirmishes had happened, in the time of Mahomet, between the Moslems and Greeks; in one of which, Zeid, a Moslem commander, had been killed. To revenge his death, his son Ofama was on the point of making an irruption into Syria at the time of Mahomet's decease. This enterprize the khalif ordered him to go on with, and it was executed by Ofama with great success. He entered Syria, and laid waste the country, doing the Greeks a good deal of damage; after which, he returned to Arabia without any considerable loss.

66
Kingdom of
Hira de-
stroyed.

Soon after, the khalif sent Khaled at the head of a powerful army to invade Irak, and put an end to the kingdom of Hira. In this undertaking he was attended with his usual success. The king Al Mondar Al Maghrur lost his life in defence of his dominions; and the kingdom was totally destroyed, after it had continued 622 years and eight months, as we have already hinted. The inhabitants became tributaries; and, according to Eutychius, the tribute collected on this occasion amounted to 70,000 pieces of money. This,

according to Al Makin, was the first tribute-money ever brought to Medina.

Amis.

The exigence of the khalif's affairs in Syria, however, did not suffer Khaled long to remain in Irak. Before the departure of the army under his command, Abu Becr had come to a resolution to invade Syria; and finding his design approved by the principal officers of his court, he sent circular letters to the petty princes of Yaman, the chief men of Mecca, &c. informing them of his intention to take Syria out of the hands of the infidels; acquainting them, at the same time, that a war for the propagation of the true religion was an act of obedience to God. To these letters they paid a proper regard; and in a very short time appeared at Medina at the head of their respective troops, and pitched their tents round the city. Here they staid, till the Moslem army destined to act against the emperor was completely formed, and in a capacity to begin its march. The khalif, having viewed the troops from the top of an hill, and prayed to God for success, attended the generals a little way on foot. As the generals were on horseback, they could not forbear expressing their uneasiness at the khalif's thus demeaning himself; but he told them, that it signified little whether they walked on foot or rode, as they had all the same views, *viz.* the service of God, and the propagation of religion. At parting, he addressed Yezid Ebn Abu Sofian, whom he had invested with the supreme command, in the following manner: "Take care, Yezid Ebn Abu Sofian, to treat your men with tenderness and lenity. Consult with your officers on all pressing occasions, and encourage them to face the enemy with bravery and resolution. If you shall happen to be victorious, destroy neither old people, women, nor children. Cut down no palm-trees, nor burn any fields of corn. Spare all fruit-trees, and slay no cattle but such as you shall take for your own use. Adhere always inviolably to your engagements, and put none of the religious persons you shall meet with in monasteries to the sword. Offer no violence to the places they serve God in. As for those members of the synagogue of Satan *who shave their crowns*, cleave their skulls, and give them no quarter, except they embrace Islamism (Mahometanism), or pay tribute."

The Greek emperor was greatly alarmed at the approach of the Moslem army; however, he made all necessary preparations for his defence, and sent out a detachment to reconnoitre the enemy. These having fallen in with the Arabs, a battle ensued, in which the Greeks were defeated with the loss of 1200, while the Arabs lost only 120 men. This was succeeded by a great many skirmishes, in which the Moslems were generally victorious. The rich spoil taken on these occasions was sent as a present to the khalif; who having acquainted the inhabitants of Mecca with his good success, they were thereby so elated, that they furnished him with a strong reinforcement, which was immediately ordered into Syria. The Greek emperor, in the mean time, having ordered another body of his troops to advance towards the frontiers, they found an opportunity of engaging the Moslem army under Abu Obaidah, a person of great piety, but little experience in war. Him they totally defeated; and Abu Becr was so much provoked at his defeat, that he deprived him of the command, which was given to Khaled, who was

67
Abu Becr's
directions to
his general.

68
The Mo-
slems defeat-
ed.

for.

Arabia.

for this purpose recalled from Irak. That general's first exploit was the reduction of Bosra, a very rich and populous city of Syria Damascena; which, however, he accomplished by treachery rather than by force of arms. Having left a garrison of 400 men in Bosra, and being joined by Abu Obeidah's forces, he laid siege to Damascus with an army of 45,000 men. This so alarmed the emperor, that he dispatched an army of 100,000 men, commanded by one Werdan, to the relief of that city. Khaled, on hearing of the approach of this formidable army, was for marching immediately with all his forces, and giving them battle; but this was opposed by Abu Obeidah, as it would enable the inhabitants of Damascus to procure fresh supplies both of arms and provisions, and consequently render the reduction of the place more difficult. It was, therefore, at last agreed, that a body of troops should be detached under Derar Ebn Al Wazâr, an excellent officer, and an implacable enemy to the Christians (as indeed were all the Moslem generals except Abu Obeidah), to fight the enemy, whilst the siege was carried on by the two generals.

Khaled, fearing lest Derar's furious zeal and hatred to the Christians should prove fatal to his troops, told him before his departure, that though they were commanded to fight for the propagation of their religion, yet they were not allowed to throw away the lives of their men; and therefore ordered him to retire to the main body of the army, in case he found himself pressed by a superior force. But Derar, deaf to this salutary admonition, with his small body of troops rushed upon the whole Christian army, notwithstanding the vast disproportion of numbers. He charged them, however, with such bravery, that he penetrated to the spot where the general gave his orders, killed the standard bearer, and carried off the standard itself, in which was a cross richly adorned with precious stones. Nay, he would in all probability have put Werdan's army to flight, had not that general's son, the commandant of Hems, arrived in the heat of the engagement with a body of 10,000 men; with which he attacked the Moslems so briskly in the rear, that he forced them to retire, and took Derar himself prisoner. This so discouraged them, that they would have taken to their heels, had not Rafi Ebn Omeirah animated them with the following words. "What! do not you know, that whoever turns his back upon his enemies offends God and his prophet? and that the prophet declared the gates of paradise should be open to none but such as fought for religion? Come on! I will go before you. If your captain be dead, or taken prisoner, yet your God is alive, and sees what you do." This exhortation had such an effect upon his troops, that, returning to the charge, they maintained their ground with unparalleled bravery, till Khaled arrived with a considerable body of infantry and 1000 horse. The arrival of this general soon turned the fortune of the day. A party of the imperial army went over to the Moslems, and the rest took to their heels. Derar also was retaken, and carried off in triumph. However, Werdan, having collected the shattered remains of his forces, and received a reinforcement from the emperor, found his army still to amount to 70,000 men, with which he resolved to make another attempt for the relief of Damascus. They were attended with still worse success in this second at-

tempt than they had been before; being utterly defeated, with the loss of 50,000 men, so that they were no more in a condition to attempt any thing; and, in consequence of this, the city was soon taken, notwithstanding the utmost efforts of the besieged.

This disastrous event happened in the year 634; and the very day that Damascus was taken, Abu Becr died of a consumption in the 63^d year of his age. He was succeeded by Omar, who was proclaimed khalif that very day; and the first title assigned him was, *The khalif of the khalif of the apostle of God*. But the Arabs considering, that, by the additions to be continually made at the accession of every new khalif, the title would become too long, they with one voice saluted him, *Emperor of the believers*; which illustrious title descended afterwards to his successors by a kind of incontestable right.

The new khalif was no sooner settled than he replaced Abu Obeidah in the command of the army in Syria, being greatly displeased with the cruel and bloodthirsty disposition of Khaled. He also commanded Abu Obeidah to have an eye upon Palestine, and to invade it as soon as an opportunity offered. Khaled bore his disgrace with great magnanimity, and swore, that though he had always had the greatest regard for Abu Becr, and the utmost aversion to Omar, he would submit to God's will, and obey the new khalif as the lawful successor of Mahomet. The Moslem forces in the mean time having made all proper dispositions for improving the advantages they had gained, Abu Obeidah sent a detachment of 500 horse to a place called *Dair Abil Kodas*, about 30 miles from Damascus, to plunder the Christians there. In this place there lived a priest so eminent for his sanctity, that the neighbouring people of all ranks resorted to him for his blessing and instruction. When any person of distinction married, he took with him his new spouse, in order to receive this holy man's benediction. The fame of this priest's sanctity drew such numbers of people to that place every Easter, that a great fair was kept annually at his house, to which were brought vast quantities of the richest silks, plate, jewels, &c. When the Arabs drew near to this place, to which they were conducted by a Christian, they were informed that the governor of Tripoli had married his daughter to a person of distinction, who had carried his lady to the above-mentioned priest. She was attended by a guard of 5000 men; besides which the Jews, Greeks, Copts, and Armenians, at that time assembled about the monastery, amounted to 10,000. Notwithstanding this, the Moslem commander determined to carry off the lady; and having told his men, that they should either enjoy the riches of the Christians, or the pleasures of paradise, he commanded them to fall on the enemy. The impetuosity of these enthusiasts at first bore all down before them; but the Christians, perceiving they were but an handful of men, surrounded them on all sides, and resolved to make them pay dear for their temerity. But Abu Obeidah, being informed of their dangerous situation, immediately dispatched Khaled with a strong detachment to the relief of his distressed countrymen. The consequence of this was, that the Christians were entirely defeated, and the unhappy lady carried off, with 40 maids that waited upon her, as well as all the wealth brought to the above-mentioned fair; among which were many rich garments curiously

69
Damascus
besieged.

70
The Greeks
defeated
with great
laughter.

Arabia.

71
The city taken.

72
Abu Becr
dies and is
succeeded
by Omar.

73
Governor of
Tripoli's
daughter
carried off.

Arabia.

curiously wrought, and in particular one adorned with the effigies of our Saviour. All these were sold for ten times their weight of gold to some of the opulent Arabs of Yaman. The young lady was given to Abdallah, who kept her to the reign of Yezid. Of this advantage Abu Obeidah sent notice to the khalif by a letter, in which he also acquainted him that some of his men had drunk wine. These delinquents, by the advice of Ali, had each of them 80 stripes bestowed upon the soles of their feet; after which, many others, who had never been suspected of drinking this prohibited liquor, made a voluntary confession, and received the same chastisement.

74
Punishment of some soldiers who had drunk wine.

The Moslem general next set about reducing the principal fortresses in Syria, and soon became master of Kinnifrin, Baalbec, Adestan, Shaizar, and Hems; on the news of which, the Greek emperor Heraclius, resolving if possible to put a stop to the cruel and unprovoked ravages of these barbarians, sent against them an army of 240,000 men, commanded by one Manuel, whom the Arabs call *Mahan*. But this vast multitude was utterly defeated by Khaled; upon whom Abu Obeidah conferred the supreme command, on account of his superior skill in military affairs. This battle was fought near a village called *Yermouk*; and, according to the Arabian historians, the Christians had 150,000 men killed, and 40,000 taken prisoners, while the Moslems lost no more than 4030 men.

75
The Greeks utterly defeated at Yermouk.

The defeat of Yermouk was immediately followed by the loss of the whole province of Palestine. The reduction of Jerusalem was one of its first consequences; and Omar, being apprised of the success of his arms, immediately set out to visit that holy place, at the request, it is said, of the inhabitants. The khalif was attended in his journey by a numerous retinue, most of whom afterwards returned home. He rode upon a red camel, and carried with him two sacks, one of which contained a sort of provision, consisting of barley, rice, or wheat, sodden and unhusked, and the other, fruits. Before him he had a leather bottle, very necessary in these desert countries to put water in; and behind him a wooden platter. Before he left the place where he had rested the preceding night, he constantly said the morning prayer; after which he addressed himself to his attendants in a devout strain, always uttering before them some pious ejaculations. Then he communicated his provision to them; every one of his fellow-travellers eating with him out of the same platter, without the least distinction. His clothes were made of camels hair, and were in a very tattered condition; nor could any thing be more mean or sordid than the figure he made. On the road he distributed justice among his subjects, concerning which we have several anecdotes; but that most to his honour is the following.

76
Omar visits Jerusalem.

77
Anecdote of him.

Having observed some poor tributaries exposed to the heat of the sun, a very cruel punishment in those hot countries, for not being able to pay the sum demanded of them, he ordered them to be released; telling his attendants, that he once heard the apostle of God say, "Do not afflict men in this world; for those who do so, God shall punish in hell-fire at the day of judgement." His orders were immediately executed, to the great grief of the oppressors; and the khalif continued his route. On the confines of Syria he was met by Abu Obeidah attended by an escort, who conducted

him to the Moslem camp, where he was received with the utmost demonstrations of joy; and from thence to Jerusalem. The morning after his arrival, he said prayers and preached to the troops. In his sermon he repeated the following passage out of the koran, "Whomsoever God shall direct, he shall be rightly directed; and whomsoever he shall cause to err, thou shalt not find any to defend or to direct." Upon this a Christian rose up, and said aloud twice, "God causes no one to err." Omar made no answer to him, but commanded the Moslems near him to strike off the infidel's head if he repeated those words again; but the priest took care to give him no further interruption. After the conclusion of his sermon, he pitched his tent made of hair, within sight of the city. Then he signed the articles of capitulation, by which the inhabitants were intitled to the free exercise of their religion, the possession of their properties, and his protection.

The articles of capitulation being signed, Omar, in pursuance of his engagements, gave the inhabitants a sabbath, by which they were secured in the full possession of all that had been agreed upon; after which the gates were opened to him, and he entered the town, where he was waited upon by the patriarch Sophronius, with whom he conversed familiarly, and asked him many questions concerning the antiquities of the city. One of the first places they visited was the temple of the resurrection, in the midst of which Omar sat down, and when the hour of prayer was come, told the patriarch he had a mind to pray, and desired him to shew him a place for that purpose. Sophronius told him he might do so where he was; but this he absolutely refused. Then the patriarch led him to St Constantine's church; but he likewise declined praying there. At last he said his prayers upon one of the steps of the east gate of the church; telling the patriarch afterwards, that, had he prayed in any of the churches, the Moslems would have infallibly have taken it from them, which he said they might attempt as it was, and therefore gave him a paper, wherein the Moslems were commanded not to pray on the steps of St Constantine's church in any numbers, but only one by one. After this he desired the patriarch to shew him a place where he might erect a mosque; and was conducted to the place where Jacob's stone lay, on which he slept when he saw the vision of the ladder. This stone had been hitherto slighted, and no building suffered to be erected upon it, in order to fulfil our Saviour's prophecy, that the habitation of the Jews should be left unto them desolate, and that not one stone should be left upon another. In consequence of this neglect it was entirely covered with dirt, which the khalif immediately began to carry away in his vest; and the Moslems soon hastening to assist him, the stone was cleared in a very short time. We are told by Theophanes, that when Omar entered the temple of the resurrection, he was clad in such mean and dirty apparel, that the patriarch took great offence at his appearance, and with much difficulty at last prevailed upon him to put on some clean linen and clothes, till his own could be washed. The same author relates, that when the patriarch first saw Omar in that place, he could not forbear crying out, "This is of a truth the abomination of desolation, spoken of by Daniel the prophet, standing in the holy place!" These words, as Mr Ockley

Arabia.

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kley imagines, being overheard by the Moslems, they trumped up a story of the patriarch's having owned that the conquest of Jerusalem by Omar was foretold by the prophet Daniel; and that an ancient prophecy was kept in Jerusalem concerning Omar, wherein his person was described, his name and religion specified, and he declared to be the only man that could reduce that city.

Before the khalif left Syria, he divided that country into two parts; one of which, that lay between Hauran or Auran and Aleppo, which was not perfectly conquered, he committed to the care of Abu Obeidah, giving him the strictest orders to reduce it as soon as possible. Yezid Ebn Abu Sofian was commanded to take upon him the care of the other, which comprehended Palestine, and the sea-coast, and to make himself absolute master of it, having a body of troops assigned him for that purpose. He also directed Amru Ebn Al As to invade Egypt, then in a very languishing condition, with a body of Moslem forces. After having made these dispositions for extending his conquests, Omar set out for Medina, where he arrived in perfect health, to the great joy of the inhabitants, who apprehended, from his long stay at Jerusalem, that he had intended to fix his residence there.

Soon after Omar's departure, Yezid advanced to Cæsarea; but found the place so strong, that he was obliged to continue some time in a state of inaction. Abu Obeidah, in the mean time, advanced towards Aleppo, the citadel of which was at that time the strongest in Syria. The citizens were struck with the utmost consternation at his approach. They had at that time two governors, who were brothers, and resided in the castle, which was situated at a little distance from the city. The names of these two governors, who were of very different dispositions, were Youkinna and John. Their father, by the emperor Heraclius's appointment, presided over all that tract which lay betwixt Aleppo and the Euphrates; and, after his death, the chief management of affairs devolved upon Youkinna, his brother John spending his time mostly in devotion and acts of charity. He would therefore gladly have prevailed on Youkinna to purchase a peace from the Arabs with money, rather than make his country a scene of blood and ravages; but this not suiting the martial genius of Youkinna, he armed a considerable number of the citizens, among whom were several Christian Arabs, and distributed money among them. He then told his men that he intended to act offensively against the Arabs, and even to engage them if possible before they drew too near. To inspire them with the greater resolution, he observed, that the Moslem army was divided into several bodies; one of which had orders to besiege Cæsarea, another to march to Damascus, and the third to invade Egypt. Having thus animated his troops, he put himself at the head of 12,000 of them, and marched forwards to get intelligence of the enemy's motions. Abu Obeidah, in the mean time, had sent before him Caab Ebn Damarah, with 1000 men; giving him express orders not to fight till he had received information of the enemy. Youkinna's spies discovered Caab and his men resting themselves and watering their horses without the least apprehension of danger; of which the general being apprised, he posted one part of his troops in ambuscade, and with the other attacked the Mo-

slems. The Arabs behaved with their usual valour; and at first repelled the Christians, notwithstanding their superiority in numbers: but being attacked by the troops that lay in ambush, they were at last forced to retire; having 170 killed, and almost all the rest wounded.

After Youkinna's departure, the inhabitants of Aleppo, considering the calamities that awaited them if their city should be taken by storm, submitted without delay to Abu Obeidah, and were taken under the protection of the khalif. This disagreeable news being communicated to Youkinna, he posted home with all possible expedition, lest an attempt should be made on the castle in his absence. On his arrival at Aleppo, he was so highly incensed against the inhabitants, that he threatened them with death if they did not disannul the treaty with the Arabs, and deliver up the authors of it into his hands. This demand not being immediately complied with, he fell upon the citizens with great fury, and killed 300 of them; among whom was his brother John, whose head he caused to be struck off, charging him with being the author and abettor of the late pernicious scheme. He would have made a much greater slaughter, had not the Moslem army at that instant arrived before the town; upon which Youkinna retired into the castle with a considerable body of troops: but before this could be effected, he was obliged to sustain an attack from the Arabs, in which he lost 3000 men. The action was no sooner ended than the inhabitants of Aleppo brought out forty of Youkinna's men, and as a proof of their fidelity delivered them into Abu Obeidah's hands. Of these, seven embraced Mahometanism, and the rest were beheaded.

Immediately after Youkinna had shut himself up in the castle, a council of war was held in the Moslem camp, wherein it was deliberated what measures were to be pursued on the present occasion. Khaled gave it as his opinion, that the castle ought immediately to be attacked with all the Arab forces, before the emperor had time to send them any assistance. This advice was followed by Abu Obeidah, who caused the citadel to be immediately invested, and soon after he had surrounded it with all his forces, made a most vigorous assault. The besieged defended themselves with great bravery, and after a very warm dispute drove the enemy into their camp; and as they threw a great many stones out of their military engines, many of the Moslems were killed, and a much greater number wounded. This encouraged Youkinna to make a sally with a strong party of the garrison the following night. The fires being then out in the Moslem camp, and the besiegers not expecting such an unreasonable visit, 60 of them were killed on the spot, and 50 taken prisoners. Youkinna, however, being briskly attacked by Khaled, who soon drew together a body of troops to oppose him, lost about 100 men in his retreat. The next day, he caused the prisoners to be beheaded in sight of the Moslem camp; and, receiving advice that a strong party of Arabian cavalry was sent out to forage, he ordered a body of his horse to drive them to their camp; which they accordingly did, killed 130 of them, seized all their camels, horses, &c. and then retired to the mountains. Here they proposed to remain concealed till the following night, and then return to the castle; but Abu Obeidah, being informed of what had happened, detached

Arabia.

80
Aleppo submits to Abu Obeidah.

81
Cruelty of Youkinna.

82
He is besieged in the citadel.

78
He returns to Medina.

79
A Moslem detachment defeated by Youkinna.

Arabia.

detached Khaled and Derar with a body of troops to pursue the Greeks, and revenge the late affront. Khaled, being informed of the route the Christians had taken, possessed himself of the only pass by which they could return to the castle; and, having posted there a body of his men whose courage he could depend upon, took 300 of the Greeks prisoners as they attempted to return, and put all the rest to the sword. The next morning, to retaliate Youkinna's cruelty, the prisoners were all brought out and beheaded in sight of the garrison.

83
His vigi-
lance de-
fence.

Notwithstanding this disaster, Youkinna made several sallies with good success, wherein he killed a great number of the enemy, and harassed them to such a degree, that Abu Obeidah found himself obliged, for his greater security, to remove his camp to about a mile's distance from the castle; by which manoeuvre he likewise hoped that Youkinna would be left upon his guard. Herein, however, he found himself mistaken: for the Greek commander, by the prudent measures he took, eluded all surprize; and tho' Abu Obeidah continued the siege for four months after the last-mentioned blow given to the garrison by Khaled, yet he had scarce any hopes of making himself master of it at last. Having nothing material to write to the khalif, he remained a long time silent; at which Omar being very much concerned, wrote to him, desiring an account of the affairs in Syria. Abu Obeidah acquainted him that the city of Aleppo had submitted to him; and that the citadel was the only place which held out in all that country, before which he had lost a great number of men, which, he said, had induced him to think of raising the siege, and moving with his army in that track which lay between Antioch and Aleppo. This news was by no means agreeable to the khalif, who commanded his general to continue the siege at all events, and sent him a reinforcement of Arab troops, together with 70 camels, to assist the infantry in their march.

84
The citadel
taken by
stratagem.

Among the troops sent by Omar on this occasion, there was an Arab of a gigantic size, called *Dames*, who was a man of great courage and resolution. He observing the little progress made by the Moslems, bethought himself of a stratagem by which that fortress might be reduced, which seemed so difficult to be accomplished by force. He therefore desired that Abu Obeidah would assign him the command of a party consisting only of thirty men, which at Khaled's request was readily granted. Then he begged the general to raise the siege, and retire to about three miles distance from the castle, which was likewise immediately complied with. The following night *Dames*, who had posted himself with his party very near the citadel, found means to seize a Greek, from whom he learned that Youkinna, after the siege was raised, had exacted large sums of money from the citizens, on account of the treaty they had concluded with the Arabs; and that he was one of those who had endeavoured to make their escape from the oppression of such a tyrant, by slipping down from the wall. This man *Dames* took under his protection; but beheaded five or six others who fell into his hands, and could give no good account of themselves. He then covered his head and shoulders with a goat's skin, and took a dry crust in his hand, creeping on the ground till he got close to the foot of

the wall. If he heard any noise, or suspected any person to be near, he made such a noise with his cluit as a dog does when he is gnawing a bone; his companions sometimes walking, and sometimes creeping after him in the same manner. He had before dispatched two of his men to Abu Obeidah, to desire that a detachment of horse might be sent him by break of day, to support his small party, and facilitate the execution of the plan he had formed. At last *Dames* found an opportunity of raising seven men upon his shoulders, who stood one upon another's shoulders in such a manner that the highest reached the top of the wall. Here he soon placed himself, seized a watchman whom he found asleep, and threw him over the wall. Two others, whom he found in the same condition, he stabbed with his dagger, and threw them over likewise. Then he laid down his turban, and drew up the second of his brethren, as they two did the third, and by their help *Dames* himself and all the rest were enabled to mount the wall. He then privately stabbed the centry at each of the gates, and put his men in possession of every one of them. The soldiers of the garrison, however, were at last alarmed, and surrounded the Arabs, who were on the point of perishing, when Khaled appeared at the head of a detachment of cavalry. On sight of that general, who was now grown terrible to the Christians, the besieged threw down their arms and surrendered at discretion. Youkinna and some of the principal officers turned Mahometans, in order to save their possessions; and the castle, being taken by storm, was pillaged by the Moslems. *Dames* acquired great glory by this exploit; and, out of complaisance to him, the army did not decamp from Aleppo till he and his men were perfectly cured of their wounds.

85
Youk'anna's
apollacy.

After the reduction of the citadel of Aleppo, Abu Obeidah intended to march to Antioch; but was diverted by Youkinna, who was now become a violent enemy to the Christians. He told the Moslem general, that his conquest of that part of the country would not be complete without the reduction of Azaz, a place of great importance, where Theodorus, Youkinna's cousin-german, was commandant. This fortress he proposed to become master of, by putting himself at the head of 100 Arab horse dressed in the Greek habit, who were to attend him to Azaz. Upon his arrival there, he was to assure Theodorus that he was still in reality a Christian, and had taken that opportunity to escape from the Moslem camp. But, to make his story more probable, Abu Obeidah was to send after him a detachment of 1000 horse, who were to pursue him as far as Morah, a village in the neighbourhood of Azaz, with orders to post themselves there; from whence, if such a measure should be found necessary, they might easily advance to Azaz, to facilitate the conquest of that place. To this scheme Abu Obeidah agreed; but Youkinna with all his men were immediately taken prisoners by Theodorus, who had been informed of the whole affair by a spy in the Moslem camp, who had sent him a letter by a pigeon. The fortress, however, was soon reduced, and Youkinna regained his liberty; but was soon after taken prisoner a second time, and brought before his old master Heraclius, who then resided at Antioch. He told the emperor, that he had only pretended to embrace Mahometanism,

86
He is taken
prisoner and
brought be-
fore Hera-
clius.

metanifin,

Arabia.

metanisin, in order to be able to do his Imperial Majesty the more essential service; and so far gained upon him, that he was soon after appointed governor of that city; the consequence of which was, that the Arabs were put in possession of it by his treachery.

87
Attempt to
assassinate
Omar mis-
carries.

The emperor being quite disheartened at his continual bad success, it was suggested to him by the king of Ghassan, who had fled to him for refuge, as we have already observed, that, however desperate his affairs might be, they would be perfectly restored by the assassination of the khalif. This piece of service he undertook to perform for the emperor; and dispatched one Wathek Ebn Mofaser, an Arab of his tribe, and a resolute young man, to Medina for that purpose. Wathek, some time after his arrival there, having observed the khalif to fall asleep under a tree, on which he had placed himself so as not to be observed by any one, drew his dagger, and was upon the point of stabbing him; but, as the Arab writers tell us, he was deterred by a lion, who walked round the khalif, and licked his feet till he awoke, after which he instantly went away. This struck Wathek with a profound reverence for Omar; he came down from his tree where he had been confined by the lion, confessed his design, and embraced the Mahometan religion.

88
The Greeks
defeated.

Soon after the reduction of Antioch, Abu Obeidah sent an account of his success to Omar; and receiving an order to invade the mountainous parts of Syria, he asked his general officers which of them would command the body of troops destined for that purpose. One Meisarah Ebn Mefrouk having offered his service, the general gave him a black standard, with the following inscription upon it in white letters, "There is but one God; Mahomet is the Apostle of God." The body assigned him for this purpose consisted of 300 Arabs, and 1000 black slaves commanded by Dames. Meisarah, at the head of his troops, with some difficulty ascended the mountains, and, with much more, advanced to that part where the emperor's forces were posted. The cold was so intense on the summits of those mountains, that the Arabs, who had been accustomed to a warm climate, could hardly bear it. For some time they could not meet with a single person to give them intelligence of the enemy's motions; but at last they took a Greek prisoner, who informed them that the imperial army, which consisted of 30,000 men, lay encamped on a spot not three leagues distant. The prisoner refusing to profess Mahometanism, they cut off his head, and then marched towards the imperial camp. The Greeks, hearing of their approach, advanced to meet them; and the Moslems being surrounded on all sides, were on the point of being all cut off, when Khaled appeared at the head of 3000 horse, and after him Ayab Ebn Ganem with 2000 more. At the approach of the horse under the command of the terrible Khaled, the Greeks retired, leaving all their tents, together with their rich furniture and effects, to the Arabs. In this engagement, one of Omar's chief favourites, named *Abdallah Ebn Hodafsa*, was taken prisoner, and sent directly to Constantinople. The khalif was so much concerned at this, that he sent a letter to Heradius, desiring his release; which the emperor not only complied with, but made him many valuable presents, sending at the same time a jewel of immense value as a present to the kha-

89
Omar's dis-
interested-
ness.

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lif. This Omar offered to the jewellers of Medina, but they were ignorant of its value: the Moslems therefore begged him to keep it for his own use; but this he said he could not be answerable for to the public. It was therefore sold, and the money deposited in the public treasury.

About this time also, Khaled advanced with a body of troops as far as the Euphrates, and took Manbij, Beraa, Bales or Balis, exacting of the inhabitants 100,000 dinars for their present security, and imposing on them an annual tribute for the future. He also made himself master of Raaban, Dulouc, Korus, the Cyrus or Cyrhus of the ancients, and several other fortified towns, nothing being now able to stand before him. Amru Ebn Al As now likewise prepared for the reducing some places in Palestine that still held out. While he remained in this province, he had a conference with Constantine the emperor's son, who endeavoured to persuade him to make peace with the Christians; but this he not agreeing to, unless they would consent to pay tribute, all hopes of an accommodation vanished, and the generals on both sides prepared to enter upon action. In the mean time an officer came from the Christian camp, dressed in very rich apparel, who challenged the stoutest man among the Moslems to fight him in single combat. The challenge was accepted by a young Arab officer of Yaman; who being animated by a notion, derived from the prophet himself, that "the spirits of the martyrs rest in the crops of green birds, that eat of the fruits and drink of the rivers of paradise," discovered an uncommon eagerness to encounter his enemy. But the Christian officer not only killed this youth, but two or three more of the Moslems who came to his assistance. He was then attacked by Serjabil Ebn Hofanah, one of the generals, but a man so weakened by fasting, that he could scarce stand before him, and would therefore have been undoubtedly killed, had not a Greek horseman very opportunely interposed, and with one blow of his scymitar cut off the Christian's head. Serjabil, greatly surprised at this deliverance, asked the horseman who he was, and from whence he came; to which he replied in the following terms: "I am the unfortunate Toleiha Ebn Khowaid, who set up for a prophet, and, lying against God, pretended to inspiration." In consequence of having saved his life, Serjabil introduced him to Amru; and writing a letter to Omar, wherein he acquainted him with the signal proof Toleiha had given of his repentance, he obtained his pardon from the khalif.

90
Account of
Toleiha the
false pro-
phet.

Though the two armies did not come to a general engagement, yet they had frequent skirmishes, in which the Arabs always got the better, and in some the Greeks suffered very considerably. This, together with the severity of the season, which was then uncommonly cold, so dejected the soldiery, that they began to desert in great numbers. Constantine therefore, finding his troops to diminish daily, and the Arabs to grow stronger and stronger, took the advantage of a tempestuous night to escape to Cæsarea, which Yezid had not been able to take, leaving his camp to be plundered by the enemy. This city was soon after invaded by Amru; and at the same time Youkinna, having made himself master of takes Tripoli by treachery, seized 50 ships from Cyprus and Crete, which carried a supply of arms and provisions for

91
Youkinna
takes Tri-
poli.

4 B

the

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the emperor's troops, and had entered the port without knowing that the Arabs were masters of the town. With these ships he undertook an expedition against Tyre; and, telling the inhabitants that he brought a supply of arms and provisions for Constantine's army, he was admitted into the town, and received with great kindness. Here, however, he had not been long before he was discovered by one of his own soldiers, and put under arrest, with 900 of his men. He was however set at liberty by those to whose care he was committed; and then opened the gates of the town to Yezid, by whom it had been invested. Constantine, having got intelligence at Cæsarea of the loss of Tripoli and Tyre, was so disheartened, that he set sail from that city with all his family and the greatest part of his wealth; and the citizens then thought proper to make the best terms they could with Amru. The surrender of this city was followed by that of all the other cities and fortresses in the province; and thus the Arabs drove the Greeks out of the whole country of Syria extending from the Mediterranean to the Euphrates. This conquest was completed in the 18th year of the Hegira, six years after it had been undertaken.

92
Tyre and
Cæsarea re-
duced.

93
Violent
storms,
plague, &c.

This year, there happened such violent storms of hail in the peninsula of the Arabs, that a considerable extent of territory was laid waste by them, and a great number of animals of various kinds destroyed. An epidemical distemper likewise raged at Medina, which spread itself all over the neighbouring territory, and swept away great numbers of people. Syria also was visited by a dreadful plague; so that the Moslems lost there 25,000 men, among whom were Abu Obeidah himself, Yezid Ebn Abu Sofian, Serjabil, and many other persons of distinction. In short, so great was the mortality occasioned by the plague, both in Arabia and Syria, that the Arabs file the 18th year of the Hegira the year of destruction.

94
Egypt re-
duced.

Amru Ebn Al As, having now executed the khalif's orders in Syria, set out on his expedition against Egypt. His first attempt was on Tarma, a town situated on the isthmus of Suez. This he reduced after a month's siege; and having narrowly viewed its situation, he formed a design of cutting through the isthmus, and thus joining the Mediterranean and Red sea; but this project was not well relished by the khalif, who apprehended that it would facilitate the entrance of the Christians into the peninsula of Arabia. From Tarma he marched to Meff, the Memphis of the ancient geographers; which, after a siege of seven months, was delivered up to him by the treachery of Al Mokawkas the governor. From Meff he continued his march towards Alexandria, and, having defeated the emperor's army, closely invested that city. While his army lay before this capital, Amru himself had the misfortune to be taken prisoner and carried into the town. Being brought before the governor, he asked him why he committed such ravages and depredations in the Christian territories? To this Amru resolutely answered, "We are come hither to oblige you either to profess Mahometanism, or pay an annual tribute to the khalif; to one of which conditions you must submit, or be all of you put to the sword." A Greek who stood by, hearing this, told the governor, that Amru was certainly the Moslem general, and therefore desired him to cut off his head. Upon this, Werdan, one of Am-

Arabia.

ru's slaves, perceiving the extreme danger his master was in, gave him a box on the ear, exclaiming against his impudence for talking in such a manner. The governor, being imposed upon by this shallow artifice, not only saved his life, but, to shew his generosity, dismissed him without ransom. This was soon followed by the loss of Alexandria, and that by the conquest of the whole kingdom: after which, Amru dispatched Okba Ebn Nafit, with a body of troops, to penetrate farther into Africa; and that general made himself master of all the country lying between Barka and Zowilah, reducing under his dominion also that part of the continent which now forms the piratical kingdom of Tripoli in Barbary.

95
Together
with Barca
and Tripoli.

Soon after the Moslems had made themselves masters of Alexandria, a grievous famine raged in Arabia, particularly at Medina, then the residence of the khalif. This obliged Omar to write to Amru to send him a supply of corn, with which Egypt at that time abounded. In compliance with this order, Amru sent a train of camels laden with corn, in a continued line from Egypt to Medina, the first of which were entering Medina when the last were leaving Alexandria. But this method of conveying corn proving too tedious and expensive, he ordered him to clear the Amnis Trajanus of Ptolemy, now the Khalis, which runs from one end of Cairo to the other, of the sand and gravel with which it was choked. This he accordingly did, and by that means rendered the communication between Egypt and Arabia much more easy than it had formerly been.

While the Arabs thus extended their conquests in the west, they were no less successful in the east. We have already taken notice of Khaled's having been sent into Irak to reduce the kingdom of Hira, and of his being recalled to assist in the conquest of Syria. As the kings of Hira were under the protection of the Persian monarchs, the destruction of that kingdom necessarily brought on a war with the Persians. After the departure of Khaled, the command of the forces was left with Abu Obeid Ebn Masud, together with Al Mothanna Ebn Haretha, Amru Ebn Hafem, and Salit Ebn Kis. Abu Obeid having passed a river, contrary to the advice of the other generals, was killed, and his troops in great danger; however, Al Mothanna made an excellent retreat, and repassed the river without any considerable loss. After this he fortified himself in his camp till he received a considerable reinforcement from the khalif; when the Moslem army marched to Dir Hind, and thence continued to make frequent excursions, ravaging that part of Irak that lay next to the Euphrates. A body of 12,000 chosen horse was now dispatched against those invaders, under the command of one Mahran. At first the Persians had the advantage, and obliged the Arabs to retire; but they were soon brought back by Al Mothanna, and the battle lasted from noon till sunset. At last Al Mothanna, engaging Mahran in single combat, laid him dead at his feet; upon which the Persians fled to Al Madayen, a town situated on the Tigris, about a day's journey from Bagdad. After this a powerful army was dispatched by the Persians under the command of one Rustam; but he also was killed, and his troops were entirely dispersed. At the same time, Abu Musa, another Moslem general, defeated a formidable body of troops under the command of Al Harzaman, a noble Persian, at Ahwas.

96
The Per-
sians defeat-
ed.

Not

Arabia.

Not content with those victories, soon after the reduction of Damascus, the khalif dispatched Saad Ebn Abu Wakkas, to dislodge the Persians from some districts they possessed in the neighbourhood of the Euphrates. Saad having drawn together a body of 12,000 men, advanced to Kadesia, a city bordering upon the deserts of Irak; where having utterly defeated an army of 120,000 Persians, he made himself master of the opulent city of Al Madayen, and possessed himself of Yezdegerd's treasure; which was so rich, if we may believe the Arabian writers, that Saad took out of it three thousand millions of dinars, amounting to two thousand and twenty-five millions of pounds sterling, an enormous and almost incredible sum. From thence Saad went to that part of the palace where the king's plate was deposited, which he carried off, as well as an immense quantity of camphire with which another part of the palace was entirely filled. This last the Arabs seem to have carried off merely for the sake of plundering, as they were so much unacquainted with the nature of it, that they mixed it with their bread, which gave it a bitter and disagreeable taste. Afterwards the Arab general carried off the crown and royal garments, adorned with gold and jewels of inestimable value. He also plundered his armoury, which was well stored with all sorts of weapons; after which he caused the roof of his porch to be opened, where he found another treasure equal in value to ten millions of crowns. He also found among the furniture of the palace, a piece of silk tapestry, 60 cubits square, which was adorned with a great variety of beautiful flowers, herbs, and plants, formed of gold, silver, and jewels the most valuable that could be procured. This being brought to Omar, he cut it in pieces, and distributed it among the Moslems; and that part which fell to Ali's share, and which was yet none of the best, he sold for 20,000 crowns.

98
Mesopotamia reduced.

In the twentieth or twenty-first year of the Hegira, the Arabs, still unsated with conquest, invaded Mesopotamia under Aiyad Ebn Ganem, where the city of Edessa submitted on the first summons. From Edessa he marched to Constantia, or Constantina, supposed to be the Nicophorium of the ancients. This he took by storm, as likewise Daras, where he massacred all the people he found in the place; and these repeated successes so terrified the rest of the fortified towns, that they all submitted without resistance. At the same time Al Mogheirah Ebn Shaaba, one of the khalif's commanders, made himself master of Shiz, a place famous for the birth of Zerdusht the Persian philosopher, and over-ran the whole province of Aderbijan. He also possessed himself of all the country of Armenia bordering on mount Taurus; nay, he in a manner obliged the whole region to own the authority of the khalif, and penetrated into Cappadocia. The same year also Saad made himself master of Ahwaz, the capital of Khuzestan (the ancient Susiana); in consequence of which he became master of the greatest part, if not the whole, of that province; at the same time that Al Nooman conquered the greatest part of Khorasan. But while Omar's troops were thus irresistibly over-running the finest countries in the known world, a period was put to his conquests and his life, by a Persian named *Abu Lulua*, who stabbed him thrice in the belly, while he was performing his devotions at

99
Omar murdered.

Medina. The reason of this was because the khalif refused to remit him some part of the tribute which according to the Mahometan custom he was obliged to pay for the free exercise of his religion. The Arabs, perceiving that he had killed their sovereign, immediately rushed upon him; but the assassin defended himself so desperately, that he killed seven of them and wounded 13; but at last one of the khalif's attendants threw his vest over him, and seized him; upon which he stabbed himself, and soon after expired.

Omar, having languished three days after the wounds given him by the Persian, expired in the 10th, 11th, or 12th year of his reign, and after his death Othman Ebn Affan was chosen; though Ali had a better title, and seems indisputably to have been the most virtuous, if not the only virtuous person, as well as the bravest warrior among them. He was inaugurated in the 24th year of the Hegira, nearly coincident with the year of our Lord 645.

Othman was no sooner settled on the throne, than he commanded Al Mogheirah to complete the conquest of the territory of Hamadan; which he easily accomplished, and at the same time reduced Bira, a strong castle in Mesopotamia, which either had never submitted, or had revolted on the departure of the Moslem troops out of that province. Another army, under Abdallah Ebn Amar, was also dispatched into Persia, to deprive Yezdegerd of the poor remains of his dominions; and this was done so effectually, that the unhappy monarch was obliged to fly to Sijestan and abandon Persia altogether.

In the 27th year of the Hegira, the island of Cyprus was reduced by Moawiya; who soon after conquered the island of Aradus, and took Ancyra; after which he reduced the island of Rhodes, broke in pieces the famous Colossus, and sold the metal of it to a Jew of Edessa. In the mean time, another of the Arab commanders entered Isauria, where he committed dreadful depredations, plundering many towns and villages, putting a great number of people to the sword, and carrying off 5000 prisoners. In the 31st year of the Hegira, one Habib, having made an irruption into that part of Armenia which was still unconquered, defeated a body of the emperor's troops, pursuing them as far as mount Caucasus, and laying waste all the neighbouring territory. About the same time also, Abul Abar, who had been constituted admiral by Moawiya, gave the emperor Constantine a signal defeat by sea, on the coast of Lycia, in which such a number of Christians were killed, that the neighbouring sea was dyed with their blood.

But while Othman was thus carrying every thing irresistibly before him abroad, he neglected to secure the affections of his subjects at home, which soon proved his ruin. Sedition was industriously propagated through all the provinces of the empire, and articles of accusation brought against the khalif. The chief of these were, That he had recalled one who had been banished by the prophet; that he had removed Saad, an officer of distinguished bravery, and supplied his place by one who drank wine, and was otherwise of a scandalous life; that he had squandered away vast sums among his favourites; that he had removed Amr from the government of Egypt, to which he had preferred his own foster-brother; and, lastly, that he had pre-

4 B 2

sumed

Arabia.

100
Succeeded by Othman.

101
Colossus of Rhodes destroyed.

102
Inferred against the khalif.

Arabia.

fumed to sit on the top of Mahomet's pulpit, whereas Abu Becr had always sat on the highest step, and Omar on the lowest. To this formidable accusation the poor khalif pleaded guilty, and promised to make all the reparation in his power; but his condescension only served to increase the insolence of the rebels. They were however appeased by Ali; and public tranquillity had undoubtedly been restored, had it not been for Ayesha, one of Mahomet's widows, who procured the destruction of the khalif by a scheme truly worthy of the wife of such an husband. That traitress, being desirous of raising one of her favourites named Telha to the dignity of khalif, prevailed on Merwan the secretary of state to write a letter to the prefect of Egypt, enjoining him to put to death Mahomet Ebn Abu Becr, with whom it was sent, and who was to be his successor. This letter Merwan took care should be discovered; and Mahomet taking it for a genuine order of the khalif, published the supposed injury all over the neighbouring countries. He then marched with a body of rebels to Medina, where the innocent khalif was besieged in his palace; and, notwithstanding all his protestations, nothing less than his death could satisfy the enraged multitude. In this deplorable situation, Othman sent to Ali for assistance, who commanded his two sons Hasan and Hoesin to defend the palace-gates. This they did for some time with fidelity enough, till finding the khalif reduced to great straits for want of water, they abandoned their posts; upon which the rebels easily made themselves masters of the palace, and cruelly murdered the khalif, in the 82^d year of his age, after he had reigned 12 years. His body remained three days unburied; and was at last thrown into a hole made for it, without the usual ablution, or the least funeral solemnity.

103
He is mur-
dered.

The arms of the Moslems had hitherto been so successful, and their conquests so rapid, that they may seem not only to have vied with Alexander, but to have bid fairer for universal monarchy than any nation either before or since.—The ruin of mighty empires always originates from the impossibility of keeping them united. Divisions arise; civil wars break out; and the kingdom being weakened by these intestine feuds, the common enemies take advantage of them to ruin the whole fabrick.—If we consider Mahomet, as in truth he was, not as an enthusiast, but as a politician, and the founder of an empire; we shall find him, in that capacity, superior perhaps to any that ever existed. The empire of Alexander the great, which arose with still more rapidity than that of the Arabs, had no support but from his own ambition and personal qualifications. While he lived, he was without a rival, because all were afraid of him; but when he died, the bands of union, whereby his empire had been held together, were immediately dissolved. His captains were not inspired with the same veneration for his son, who was unborn at the time of his death, that they had for his father; and therefore they sought not to conquer for him, but for themselves; and the consequence was, that the kingdom fell to pieces the moment that he died. The same thing happened to the empires of Jenghiz Khan, Tamerlane, and others, who made vast conquests in a short time. They erected mighty empires indeed; but their duration, we may say, was but momentary. The empire of the Romans was founded

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on a kind of enthusiastic desire of aggrandizing the city of Rome: patriotism became fashionable; and as the city never ceased to exist, those who conquered always had the same end in view, namely to exalt the republic more and more. This empire therefore was not only very extensive, but very durable; though, as it was impossible that mankind could always continue to venerate a city, the same divisions that ruined other empires, at last brought this to an end.—The foundation of Mahomet's empire seemed to be still more firm. He was not only the king, but, we may say, the God of his people. Whatever enthusiastic people may find in defending their country, nay even their nearest relations, experience has taught us, that it is greatly inferior to what is shewn by those who fight in defence of religion. This enthusiasm Mahomet had taken care, not only to bring over to his side, but to exalt to its highest pitch, by inculcating upon his followers, that their rewards in the next world should be proportionable to the fury with which they fought in this. To live at peace, except with those who submitted to his will, did not at all enter into his plan; and he who made no conquests, or at least did not strive to make them, was no true believer. By this means, let his empire be ever so much extended, the temptation to making fresh conquests was still equally strong; and not only the commanders of armies, but every private person, had the most powerful motives to urge him towards the conquest of the whole world, had that been possible.—The only thing Mahomet seems to have failed in, was the appointment of the succession to the apostleship; and why he was deficient in this, is inconceivable. From this one source proceeded the divisions which ruined his empire when it was scarce erected, and of which we are now to give the history.

104

Causes of
the decline
of the Mos-
lem empire.

Tho' the prophet had been so deficient in providing for the safety of his kingdom as not to name a successor at his death; yet his son-in-law Ali was always of opinion, that the succession belonged of right to him; and that it ought to be, like that of other kingdoms, hereditary. This disposition to render the apostleship hereditary in his family, was, in all probability, what disgusted the Moslems with Ali; against whom they could otherwise have no objection: for he was endowed with every amiable quality; a firm believer in Mahomet; and of such unparalleled strength and courage, that he never declined a combat to which he was challenged, nor ever failed to come off victorious; for which reason he was styled by his countrymen, "the Lion of God."

105

Character of
Ali.

On the death of Othman, however, notwithstanding the prejudices against Ali, as none could pretend to good a right to the khalifat as he, the Arabs immediately took the oath of allegiance to him, tho' with an intention to break it as soon as possible, as was fully evinced by the event. The disturbances which happened immediately on Ali's accession were owing partly to the machinations of Ayesha, who, having got Othman murdered on purpose to raise Telha to the dignity of khalif, and now finding Ali unanimously chosen, resolved to destroy him also. She therefore pretended great concern for the death of the late khalif, and accused Ali of being his murderer: but being reproved by one of the Moslems for endeavouring to blacken an innocent person, when she could not but know

106

He is chosen
khalif.

know

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107
Disturbances raised by Ayeſha.

know herſelf guilty; ſhe replied, that Othman's infidelity had indeed made her his enemy, but that ſhe had forgiven him upon his repentance. At the time of Ali's inauguration ſhe was at Mecca, where ſhe enjoyed a very conſiderable ſhare of influence and authority. At her inſtigation, Telha Ebn Obaidallah, and Zobeir Ebn Al Awam, began to repreſent to Ali, that the murderers of Othman ought to be brought to condign puniſhment; offering themſelves at the ſame time for that purpoſe. This they did purely to loſe diſſention, for they themſelves had been deeply concerned in the murder; and Ali, ſufficiently aware of their intention, told them it was impoſſible till the empire ſhould be more ſettled. Finding themſelves diſappointed in this attempt, they next begged the government of Cuſa and Baſra, that they might with the greater facility extinguish any rebellion that ſhould happen. Here again Ali was aware of their intention; and reſuſed their requeſt, under pretence that he flood in need of perſons of their great capacity, as counſellors, about his perſon. Then they deſired leave to perform a pilgrimage to Mecca, which the khalif could not reſuſe; and they were no ſooner got there, than they ſet about raiſing an army againſt him without any provocation at all.

108
And Moawiyah.

This, however, was not the only ſource of diſcord at preſent. Ali had been diſpleaſed with the governors of provinces appointed by Othman; and therefore diſmiſſed them immediately upon his acceſſion. This was very impolitic; but he was prompted to it by that raſhneſs and want of prudence which is inſeparable from, or rather is the very eſſence of, great courage. The conſequence of this was, that Moawiyah, governor of Syria, was, immediately upon his diſmiſſion by Ali, proclaimed khalif by the troops under his command.—Thus the Moſlems were divided into two factions; the one, under Moawiyah and Ayeſha, who adhered to the houſe of Ommyiah, to which Othman and Moawiyah belonged; and the other, to Ali. The adherents of the houſe of Ommyiah were called *Motazalites*, or *ſeparatiſts*.

109
Ali raiſes an army.

Ali finding how matters were ſituated, and that a very ſtrong party was formed againſt him, endeavoured to ingratiate himſelf as much as poſſible with the Koraiſh; and to raiſe an army againſt Ayeſha, who had now taken the field, and even reduced the city of Baſra. He made a formal ſpeech to the people on hearing this bad news, and deſired their aſſiſtance. But tho' he was very much beloved on account of his perſonal merit, and the beſt orator of the age, he could not with all his eloquence for ſome time prevail on them to give a deciſive anſwer in his favour. At laſt Ziyad Ebn Hantalah ſtept to Ali of his own accord, and ſaid, "Whoſoever retreats, we will advance." Upon this two Anſars, doctors of the law, flood up, and pronounced Ali innocent of the death of Othman; which deciſion ſoon induced the Anſars and the body of the people to eſpouſe his quarrel. He then left Medina with a body of 900 men, and advanced to Arrabah, where he was joined by ſeveral other parties. From this place he wrote to the people of Cuſa and Medina, preſſing them to ſend him farther aſſiſtance, and to diſpoſe the Motazalites to an accommodation. From Medina he very ſoon obtained a large ſupply of horſes, arms, and other neceſſaries; and from Cuſa he obtained with diſ-

ſiculty a reinforcement of 8000 men.

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Being greatly animated by this ſeaſonable ſupply, Ali advanced towards Baſra, where the troops of Ayeſha were ready to receive him. Both parties ſeemed averſe to an engagement; and Ayeſha began to be very much intimidated at the fight of Ali's army, which, however, was inferior to her own: but, by ſome means or other, a battle was at laſt brought about, in which Ayeſha was defeated and taken priſoner. The only remarkable effort that was made by the troops of Ayeſha in this engagement, was in defence of her perſon. It is ſaid, that no fewer than 70 men who held her camel by the bridle, had their hands cut off ſucceſſively; and that the pavilion in which the fat was ſo full of darts and arrows, that it reſembled a porcupine. Ayeſha was treated very kindly by Ali, who at firſt ſet her at liberty, but afterwards confined her to her houſe at Medina, and commanded her to interfere no more with ſtate-affairs, though he ſtill allowed her to perform the pilgrimage to Mecca.

110
He defeats and takes Ayeſha priſoner.

After this victory, Ali had no enemies to contend with either in Arabia, Irak, Egypt, Perſia, or Khoraſan. A ſtrong party, however, ſtill remained in Syria, headed by Moawiyah, who founded his claims to the khalifat on a pretended declaration of Othman that he ſhould be his ſucceſſor. In this deſection he was joined by Amru Ebn Al As, who had obtained a promiſe of the government of Egypt, provided Moawiyah could be advanced to the dignity of khalif.

Ali, with his uſual good-nature, endeavoured to bring the rebels to a ſenſe of their duty, and often ſent propoſals of accommodation to Moſwiyah; but he ſtill remained inflexible. Perceiving, therefore, that it would be neceſſary to invade Syria, he entered that country with an army of 70,000 men, while Moawiyah advanced to meet him with 80,000; and by repeated reinforcements Ali's army at laſt amounted to 90,000, and Moawiyah's to 120,000. The two armies came in fight of each other towards the cloſe of the 36th year of the Hegira, when they ſeemed ready to enter upon action; but only ſome ſkirmiſhes happened between them, wherein neither party ſuſtained any conſiderable loſs. The firſt month of the 37th year was ſpent in fruitleſs negotiations; but in the ſecond month they began to fight in different parties, without ever hazarding a general engagement. Theſe battles continued, according to ſome, for forty days, and according to others, an hundred and ten. Moawiyah's loſs amounted to 45,000 men, and Ali's to 25,000, among whom were 26 who had been intimately acquainted with Mahomet himſelf, and were dignified with the title of *The companions*. The moſt famous of theſe was Ammar Ebn Yaſer, Ali's general of horſe, who was upwards of 90 years of age, and was highly eſteemed by both parties. The loſs of this general ſo exasperated Ali, that he charged the Syrians with a body of 12,000 men, broke them, and challenged Moawiyah to fight him in ſingle combat. This challenge Moawiyah declined, inſiſting that it was not a fair one, as Ali could not but be ſenſible of his ſuperiority in ſtrength. As the challenge was given in the hearing of both armies, Amru inſiſted that Moawiyah could not in honour reſuſe it; but the coward made no other reply than that Amru aſpired to the khalifat himſelf, and wanted to enjoy it after his death. The battle

111
Moawiyah challenged to a ſingle combat by Ali.

Arabia.

battle being now renewed with great fury, Moawiyah's forces were pushed to their camp; which had certainly been taken, had not Amru bethought himself of the following stratagem to retrieve Moawiyah's affairs, when he seemed on the very brink of destruction. He ordered some of his men to fix copies of the Koran to the points of their lances, and carry them to the front of the battle, crying out at the same time, "This is the book that ought to decide all differences between us; this is the book of God between us and you, that absolutely prohibits the effusion of Moslem blood."—This produced the desired effect. The khalif's troops threw down their arms, and even threatened him with death if he did not found a retreat; which he therefore found himself obliged to do, and thus had a decisive victory wrested out of his hands.

According to this new mode of decision, the two parties were each to choose their arbitrator; but even this was not allowed to Ali, though Moawiyah had liberty to choose Amru Ebn Al As. The troops of Irak, not content with offering so gross an affront to the khalif, insisted on naming for his arbitrator Abu Musa Al Ahavi; a very weak man, and one who had already betrayed him. The consequence of this appointment was, that Ali was depoted by both the arbitrators; and he accordingly dropt his title to the khalifat, but without laying down his arms, or putting himself in Moawiyah's power.

After this decision, Ali retired to Cufa; where he was no sooner arrived, than 12,000 of these troops who had themselves forced him to accept of the arbitration, pretending to be offended with the step he had taken, revolted from him. These were called *Kharejites*, that is, rebels or revolters; and *Mohakkemites*, or judicarians, because they affirmed that Ali had referred to the judgment of men what ought to have been only referred to the judgment of God; and, therefore, that instead of keeping the peace he had made with Moawiyah; he ought to pursue his enemies, who were likewise the enemies of God, without mercy. To this Ali replied, That as he had given his word, he ought to keep it; and, in so doing, he only followed what was prescribed by the law of God. The Kharejites replied, That God was the only judge between him and Moawiyah, and that consequently he had committed an enormous sin, of which he ought sincerely to repent. This irritating Ali, he with some warmth replied, That if any sin had been committed on this occasion, it was by themselves, who had forced him to take the steps of which they now complained. This answer not proving agreeable, they chose for their general Abdallah Ebn Waheb, who appointed for their rendezvous Naharwan, a town seated between Wafet and Bagdat, about four miles to the eastward of the Tigris. Here they assembled an army of 25,000 men; and Ali, having tried gentle methods ineffectually, at last marched against them in person. Before he attacked them, however, he planted a standard without the camp, and made proclamation by sound of trumpet, that whoever would repair to it should have quarter, and whoever would retire to Cufa should find a sanctuary there. This had such an effect, that Abdallah's army was soon reduced to 4000 men, with whom he rushed upon the khalif's forces; but all of them were cut in pieces, except nine who escaped.

Had Ali marched against Moawiyah immediately af-

ter the defeat of the Kharejites, and while his troops were flushed with victory, he had probably reduced him entirely: but by allowing his troops to refresh themselves, they all deserted him, and Moawiyah's party had an opportunity of gathering still more strength; and though Moawiyah's troops often made incursions into the territories of Ali, the latter seems afterwards to have acted only on the defensive. At last the Kharejites, imagining that it would be for the good of the Moslem affairs that Moawiyah, Ali, and Amru, were dead, dispatched assassins to murder all the three. Moawiyah was wounded, but recovered; Amru's secretary was killed by mistake; but Ali was wounded with a poisoned sword, which occasioned his death. The assassin was taken, and Ali would have pardoned him had he recovered, but ordered him to be put to death if he died, that he might, as he said, "have an immediate opportunity of accusing him before God." Even in this order he shewed his usual clemency, as he ordered the assassin to be dispatched at one blow, and without torture of any kind.

Thus fell Ali, the most virtuous of all the Mahometan khalifs, after he had reigned near five years, and lived sixty-three. He was pressed by those about him to nominate a successor before he died; but this he declined, saying, he would follow the example of the Apostle of God, who had not named any: however, as his son Hasan inherited his father's piety, though not his courage, he was declared khalif without any scruple. Moawiyah, however, behaved in such a manner towards him, as shewed his hostile intentions; and those about Hasan pressed him to declare war immediately. This Hasan, who was of an exceeding mild and peaceable disposition, could hardly be persuaded to do; and though he at last took the field, yet he immediately perceived his incapacity to dispute the empire with Moawiyah; and therefore resigned it, in spite of all the remonstrances of his friends, to a traitor, who caused him after some years to be poisoned by his wife.

Moawiyah, being thus left sole master of the Moslem empire, found himself under a necessity of reducing the Kharejites, who were his enemies as well as Ali's, and had now gathered together a considerable army. Against these rebels the khalif would have dispatched Hasan, but that prince refused; upon which he sent the Syrian troops against them, who were defeated: however the Cusans, being at last persuaded to take up arms, soon extinguished the rebellion, and settled Moawiyah more firmly than ever on the Moslem throne. In the 48th year of the Hegira, the khalif sent his son Yezid with a powerful army to besiege Constantinople. In this expedition he was attended by three or four of the *Companions*, who, notwithstanding their age, were prompted by zeal to undergo incredible fatigues. The Moslem forces too, though they suffered extremely, were animated to surmount all difficulties by a tradition, according to which the prophet in his lifetime declared, "That the sins of the first army that took the city of Cæsarea should be forgiven." Concerning the particulars of this expedition we are in the dark: only, in general, that it proved unsuccessful; and in it Abu Ayub, who had been with Mahomet at the battles of Bedr and Ohod, lost his life. His tomb is held in such veneration by the Moslems, that the Sultans of the Ottoman family gird their swords on it, on their accession

Arabia.

115
They attempt to murder Ali, Amru and Moawiyah.

116
Ali assassinated.

117
Succeeded by Hasan.

118
Wherefore the khalif to Moawiyah.

119
Constantinople besieged without success.

113
Amru's stratagem.

113
Ali depoted.

114
He defeats the Kharejites.

Arabia.

sion to the throne. In the 54th year of the Hegira, the Arabs made an irruption into Bukharia, and defeated a Turkish army that opposed them. The Turks lost a great number of men; and the queen, who commanded in person, with great difficulty made her escape. She had only time to put on one of her buskins; the other fell into the hands of the Arabs, who valued it at no less than 2000 dinars. About this time also, according to the Greek historians, a treaty was concluded between the emperor and the Molesms, whereby the latter were allowed to keep the territories they had seized; in consideration of which they were to pay 3000 pounds weight of gold, 50 slaves, and as many choice horses. To these dishonourable conditions they were obliged to submit, in consequence of their late unsuccessful expedition to Constantinople, and some other defeats they had received. This peace was to continue for 30 years. The next year, Moawiyah, having conferred the government of Khorasan upon Saad, Othman's grandson, that general, soon after his promotion, passed the Jihun, or Amu, the Oxus of the ancients, and advanced with a body of troops to Samarkand, which opened its gates to him on his approach; soon after which he defeated an army of Ubeck Tartars, and marched directly to Tarmud, or Tarmid, which also surrendered without opposition. The 57th year of the Hegira was remarkable for nothing but vast swarms of locusts, which did incredible damage in Syria and Mesopotamia; and great discontents on account of the khalif's having nominated for his successor his son Yezid, a person of scandalous life, and no way worthy of the throne. The 58th year of the Hegira was rendered remarkable by the death of Ayesha, Mahomet's widow; and the 60th by that of Moawiyah, after having reigned, from Hafsan's resignation, nineteen years, three months, and five days; but concerning his age authors are not agreed. He was interred at Damascus, which was made the residence of the khalifs as long as the house of Ommiyah continued on the throne.

121
Moawiyah
dies.

122
succeeded
by Yezid.

Yezid was proclaimed, in consequence of his nomination, the same day his father died. His inauguration was performed on the new moon of the month Rajeb, corresponding to April 7th, 680. Immediately after his election, he wrote to Al Walid, governor of Medina, to seize Hofein the remaining son of Ali, and Abdallah Ebn Zobeir, in case they refused to acknowledge his right. He accordingly tendered the oath of allegiance to Hofein, who returned an evasive answer, and found means to escape to his own house. As for Abdallah, he delayed waiting upon the governor, under various pretences, for 24 hours; after which he made his escape to Mecca: hither Hofein followed him; but received an invitation from the people of Cufa, who promised to assist him in vindicating the rights of his father Ali and himself. In the mean time, Yezid, being informed of Al Walid's negligence in suffering Abdallah and Hofein to escape, removed him from his employment, appointing in his room Amru Ebn Saad, at that time commandant of Mecca. The new governor immediately dispatched against Abdallah Amer Ebn Zobeir, Abdallah's own brother, who mortally hated him: but Abdallah, having engaged Amer in the field, defeated and took him prisoner; which greatly raised his reputation at Medina, altho'

123
Hofein and
Abdallah
refuse to ac-
knowledge
him.

Arabia.

Hofein's superior interest among them still rendered him incapable of aspiring to the khalifat by himself.

While Abdallah was thus strengthening himself at Mecca and Medina, Hofein was doing the same at Cufa. On the first notice of their inclinations, he had sent to them Moslem Ebn Okail, to whom, as representative of the son of Ali, they had taken an oath of allegiance, and were now very pressing on Hofein to honour their city with his presence. Besides this, Hofein was supported by the forces of Irak, who retained a great veneration for the memory of his father, and had all along considered the government of Moawiyah as a downright usurpation.

Notwithstanding all these steps taken at Cufa in favour of Hofein, the deliberations of the conspirators were carried on with such secrecy, that Al Nooman the governor continued a stranger to them, even after the Cufans had determined immediately to enter upon action with an army of 18,000 men. At last, however, he began to be roused from his lethargy; but Yezid being displeased with his conduct, removed him from his government, appointing for his successor Obeidallah Ebn Ziyad. This governor entered the city in the evening, and was received with all possible demonstrations of joy by the Cufans, who mistook him for Hofein, owing to a black turban which he had on his head, resembling that which Hofein usually wore. His first care was to extinguish the sedition that had been excited by Moslem. In order to this, he commanded a trusty servant to disguise himself, and personate a stranger come out of Syria to see the inauguration of Hofein; that he might get admission into Moslem's house, and penetrate all his councils. This commission was faithfully executed; and Obeidallah understanding that Moslem lodged in the house of one Sharik, who was then sick, sent a messenger to Sharik, letting him know that he intended to visit him on a certain day. Sharik immediately came to a resolution to receive him, and appointed Moslem a place in the corner of the room whence he might rush out upon Obeidallah and kill him. The visit was accordingly made; but Moslem's heart failing him, the governor escaped: Hani, however, in whose house Moslem had first lodged, was imprisoned by Obeidallah. Upon the news of this, Moslem assembled about 4000 men, and besieged Obeidallah in the castle. The governor, however, not in the least dispirited, made a speech to Moslem's followers, which had such an effect upon them, that they all deserted him except about 30. By the favour of the night, Moslem escaped to a poor woman's cottage in the neighbourhood; but being betrayed by her son, Obeidallah sent a detachment of 80 horse to seize him. Moslem made a gallant resistance, and thrice cleared the house of them; but being at last overpowered with numbers, and grievously wounded, he was taken and brought to Cufa. While on the road, he endeavoured to send an account of his bad success to Hofein, then, as he supposed, on the road to Cufa; but without success. When arrived at the castle, he begged a draught of water: but those who stood by told him he should have none till he drank the hamir, or boiling liquor, which the Mahometans pretend is drunk by the damned in hell; and soon after this, being brought before the governor, he was beheaded along with Hani, and both their heads sent

Arabia.

as a present to Yezid.

124
Hofein's sob-
stinacy.

Hofein, in the mean time, was preparing to set out for Cufa, having received the most favourable advices from Moslem, of whose fate he was ignorant, and who had sent him a list of 140,000 men that were ready to obey his orders. This the wife of his friends represented as a desperate enterprize, and intreated him to drop it, or at least to defer his journey till he should be better assured of success: but Hofein was deaf to all salutary counsel; nay, he could not, by the most earnest intreaties, be prevailed upon to forbear taking his wives and children along with him. The consequences of this obstinacy may be easily imagined: Obeidallah dispatched first 1000, and then 5000 men against him; with orders, however, not to offer any violence to him, provided he submitted himself. To these terms the infatuated Hofein would not agree: he offered indeed to return home, if Obeidallah would permit; but that not being granted, he desperately engaged the troops of Obeidallah, and was after long resistance cut in pieces with all his men. His head was brought to Obeidallah, who struck it over the mouth with a stick, and treated it with great contempt. He was also inclined to have put his family to death; but probably feared an insurrection, as the people of Cufa expressed great resentment on account of Hofein's death; nor was it at all agreeable to the khalif Yezid, who treated the family of the unfortunate Hofein with the gentlest kindness.

125
He is defeat-
ed and kill-
ed.

This year, the 61st of the Hegira, Yezid appointed Salem Ebn Ziyad governor of Khorasan; who, soon after entering upon the government, made an irruption into the Turkish territories. He took his wife along with him in this expedition, who was delivered of a child in the neighbourhood of Samarcand; on which occasion she is said to have borrowed some jewels from the prince of Sogd's lady, which she afterwards carried off with her. In the mean time, Saleh detached Mohalleb with a considerable body of troops to Khawarizm, the principal city of the Turks or Tartars in those parts, from which he extorted the immense sum of 50,000,000 pieces of money; from whence advancing to Samarcand, he forced the inhabitants of that city also to pay him an immense sum; and then retired, with little loss, into the province he governed.

In the mean time, Abdallah Ebn Zobeir, finding himself, by the death of Hofein, at the head of the partizans of the house of Hahem, who were greatly oppressed by Yezid, began in earnest to aspire to the khalifat. As he had therefore never owned the authority of Yezid, he now openly declared against him, and was proclaimed khalif at Medina soon after the arrival of Hofein's family in that place. Soon after his inauguration, to render himself the more popular, he expatiated on the circumstances of Hofein's death, which indeed were very tragical, and represented the Cufans as the most abandoned and perfidious villains upon earth. This went so well down with the citizens of Mecca and Medina, that they flocked to him in great numbers, so that he soon found himself at the head of a considerable force. The khalif Yezid being informed of his progress, swore he would have him in chains; and accordingly sent a silver collar for him to Merwan, then governor of Medina: but the interest of Abdallah was now so strong, that he laughed at the

126
Abdallah
proclaimed
khalif at
Medina.

menaces both of the khalif and Merwan. Nay, the governor of Mecca, though he secretly hated him, thought it good policy, as matters then stood, to keep up a good understanding with Abdallah: but this coming to the ears of Yezid, he deposed the governor; appointing in his place Walid Ebn Orbah, a man of known fidelity, and a bitter enemy of Abdallah. The new governor, therefore, immediately on his accession, used all his art and skill to circumvent Abdallah; but to no purpose, as the latter was always on his guard. This conduct, however, giving him great disgust, as well as terrible apprehensions, he wrote to the khalif, informing him that all the disturbances were owing to the untractable disposition of Walid; and that, if he would send a person of a different character, peace would soon be restored. This letter the khalif very injudiciously gave ear to, and dismissed his faithful governor, appointing in his room one who was totally unqualified for that post. The people of Medina, now having fresh intelligence of Yezid's dissolute manner of life, renounced their allegiance to him, and formally deposed him in a very singular manner. After they had assembled in the mosque, about the pulpit there, one of them said, "I lay aside Yezid as I do this turban," and immediately threw his turban on the ground. Another said, "I put away Yezid as I do this shoe," casting away his shoe at the same time. These examples being followed by others, there was a large heap of shoes and turbans almost instantly formed upon the spot. They then dismissed Yezid's governor, and banished from the city all the friends and dependents of the house of Ommyiah. These, to the number of about 1000, took refuge in the house of Merwan Ebn Al Hakem, where they were so closely besieged by Abdallah's party, that they found themselves obliged to send to Yezid for immediate assistance; acquainting him, that if they were not succoured, they must all inevitably perish. The khalif, though he wondered that such a number of men should suffer themselves to be so cooped up without making the least resistance, dispatched Moslem Ebn Okba to Medina, with a considerable body of troops, to quell the disturbances. He ordered him to spare Ali the son of Hofein and his family, as they had no hand at all in the disturbances: then he was to summon the town of Medina to surrender for three days successively; which if they refused, he was to take it by storm, and give it up to be plundered by the foldiers for three whole days.

The inhabitants of Medina, being now sensible of their danger, suffered the friends of the house of Ommyiah to withdraw quietly out of the city; tho', before they departed, a promise was extorted from them not to appear in arms against the reigning faction. Moslem, in the mean time, advanced towards the city at the head of 5000 foot and 12,000 horse; and having summoned it according to his instructions, upon its refusal, made the necessary preparations for an attack. The garrison, however, for a considerable time, made a vigorous defence; but at last, most of the Anfans and principal officers being killed, the Arabs proposed a capitulation. Moslem, however, would hearken to no terms, and insisted on their surrendering at discretion; which being refused, he entered the city after a faint resistance. Ali was treated with great respect; but all the men that had carried arms were put to the sword,

Arabia.

127
Yezid for-
mally depos-
ed.

128
Medina
ken and
plundered
by the k-
lif's force

After the reduction of Medina, Moslem directed his course to Mecca, where Abdallah then resided; but he died by the way, and the command of the troops devolved upon Hufein Ebn Thamiir Al Selwi. This general advanced to Mecca, which he besieged for 40 days, battering the town with such fury, that he beat down a great part of the famous temple there, and burnt the rest; nor would the city itself have escaped the same fate, had not an end been put to the war by the arrival of certain accounts of the death of Yezid, who departed this life in the 64th year of the Hegira, answering to the year 684 of the Christian era, having lived 39, and reigned three years and six or eight months. On the news of his death, Hufein offered to take the oath of allegiance to Abdallah; but the latter at that time durst not trust him, of which he had afterwards sufficient reason to repent.

Yezid was succeeded by his son Moawiyah II. who was proclaimed khalif at Damascus the same day that his father died; but, being of a weakly constitution, and unable to bear the fatigues of government, resigned the crown six weeks after his inauguration, and died soon after, without naming a successor.

This abdication having left the Moslem empire absolutely without a master, great commotions ensued. On the death of Yezid, Obeidallah Ebn Ziyad, governor of Basrah, represented to the citizens that they ought to choose a protector till a new khalif should be chosen; and if the person so chosen should be disagreeable to them, they might then remain in a state of independency under the protector whom they had chosen. The inhabitants, perceiving the drift of this speech, complimented him with that honour; which he accepted with seeming difficulty: but, sending a deputy to Cufa, the inhabitants of that city not only refused to acknowledge his authority, but threw dust and gravel at his messenger. This coming to the ears of the people of Basrah, they not only deprived Obeidallah of the dignity they had newly conferred upon him, but even expelled him the city. Nor could he prevail upon the Najari, a tribe of Ansars, to espouse his quarrel, nor even upon his own relations, though he distributed among them great part of the sixteen millions of pieces of money which he had found in the treasury of Basrah, and kept the remainder to himself. Nay, so odious had he rendered himself to all ranks, on account of his cruelties, particularly the death of Hufein the son of Ali, that his brother Abdallah was unable to protect him from the fury of the populace, though he kept him concealed in womens cloaths, and distributed among the mob 200,000 pieces of money. He was therefore at last constrained to leave the city, attended by a guard of 100 men. Immediately after his departure, the mob plundered his house, and pursued him, so that he was obliged to exchange his camel for an

ass, and thus with the utmost difficulty escaped into Syria.

In the mean time, Hufein Ebn Thamiir, being returned into Syria with the forces under his command, gave a faithful account of the situation of affairs in Arabia to Merwan Ebn Al Hakem. He also acquainted him of the offer he had made to Abdallah of the oath of allegiance, which the latter had refused, or at least would not come to Damascus in order to be invested with the supreme authority there. On this account he advised Merwan to take care of himself and the rest of the house of Ommyiah, who had fled to Damascus after their expulsion from Medina. On this discourse, Merwan was inclined to submit to Abdallah; but was diverted from it by Obeidallah, who insisted that no superior ought to be acknowledged by Merwan, who was at the head of the Korcish. The people of Damascus had constituted Dahak Ebn Kais their protector, who inclined to Abdallah. The Basrans were at this juncture entirely in tumult and confusion, not being able to agree about a protector after the expulsion of Obeidallah; so that at last they wrote to Abdallah, offering him the government of their territory. This he accepted, but could not be prevailed upon to stir from Mecca; nor could Merwan be persuaded to suffer any of the Syrians to perform the pilgrimage to Mecca, lest they should join Abdallah, and thereby contribute to his exclusion from the throne.

In the midst of this confusion Abdallah might have easily secured the khalifat to himself, had he not with the utmost imprudence as well as inhumanity given orders for the extermination of the house of Ommyiah. This ruined his affairs; for they being now obliged to provide for their own safety, Merwan was proclaimed khalif at Damascus; and thus the whole Moslem empire was rent into two potent factions, the one under Merwan, and the other under Abdallah.

We have already observed, that Dahak Ebn Kais inclined to favour Abdallah. This he continued to do after Merwan was proclaimed khalif, inasmuch that a battle soon ensued between his followers and those of Merwan, in which Dahak was defeated and killed; and thus Merwan became master of all the province of Syria. Soon after this victory, Merwan advanced with a considerable body of troops towards Egypt; but sent before him Amru Ebn Said with a detachment, in order to facilitate his passage. That general having defeated Abdalrahman, Abdallah's lieutenant, in several brisk actions, he at last surrendered the whole country to Merwan for a sum of money, and retired with the Arabs under his command to Hejaz. The Syrian troops, therefore, immediately took possession of that country, and obliged the inhabitants to take an oath of allegiance to Merwan, who, having appointed his son Abdalaziz to preside over Egypt, returned with the greatest part of his forces to Damascus. Here he was informed that Abdallah had dispatched against him his brother Musab with a considerable army. Against him Merwan dispatched Amru Ebn Said; who, having soon come up with him, gave him a total defeat, and dispersed his troops in such a manner, that Musab found it impossible to rally them again.

In the 65th year of the Hegira, the inhabitants of Cufa, pretending to be seized with remorse of conscience for their treachery to Hufein the son of Ali,

Merwan proclaimed khalif at Damascus.

Abdallah's forces defeated by Merwan's.

The Cufans revolt.

Arabia.

135
Joined by
Al Mokhtar.

raised an insurrection against both the khalifs, and therefore assembled a body of 16,000 men, under the command of one Soliman, who was to revenge the death of Hofein upon Obeidallah Ebn Ziyad and his adherents. But while Soliman and his troops remained yet inactive, Al Mokhtar, who had served under Abdallah, and was disgusted at not having been promoted as he expected, arrived at Cufa, and, representing the incapacity of Soliman, who indeed appears to have been totally unfit for such an enterprize, offered to take the command upon himself. This, however, was refused; and as Al Mokhtar had no opinion of Soliman's military capacity, he found means to draw off 2000 of his troops; while 10,000 more chose rather to violate the oaths they had taken, than run the risk of being cut to pieces by a superior enemy. Soliman, however, put a good face upon the matter; and, telling his troops that they were to fight for another world and not this, set forward to invade Syria with the 4000 who remained with him: but being advanced as far as Ekfas upon the Euphrates, he found that he had lost 1000 men by desertion; nor was he joined by the Separatists of Basra and Al Madayen, though they had promised him a reinforcement. Firmly persuaded, however, that his cause was the cause of heaven, Soliman continued his march all night, and next day arrived at the tomb of Hofein, where his men performed their devotions with such enthusiasm of penitence, that one present swore he never saw such crowding about the black stone in the temple of Mecca itself.—Continuing still to advance, he received a friendly letter from Abdallah Ebn Yezid, the governor of Cufa, advising him to return, and representing to him the folly of engaging so powerful an army as would be sent against him, with an handful of men: but Soliman, imagining that he was only recalled in order to support Abdallah Ebn Zobeir in his pretensions to the khalifat, persisted in his resolution of penetrating into Syria. He told his troops, that they would never be nearer the two Hofeins (Hofein, and his brother Hafan, to whom also the Shiites give that name) than they were at present; and that, should they at this time meet with death, they would be in a state of repentance, and consequently could never die in a more proper time; and after this speech, continuing still to advance, he was at last met by Abdallah at the head of 20,000 horse, who, after an obstinate engagement, cut to pieces Soliman and all his troops.

137
He is cut in
pieces with
all his men.
139
Merwan
dies.

Soon after this decisive action died the khalif Merwan, after he had reigned eleven months. He is said by some authors to have been poisoned by his wife Zeinab, Moawiyah's widow. Her he had married, with a promise that her son Khaled should succeed him; but afterwards altering the succession in favour of his own son Abdalmalec, young Khaled reproached him with his breach of promise: upon this, Merwan calling him *bastard*, the child complained to his mother, who, to be revenged for this affront, is said to have poisoned him, or smothered him with a pillow.

In the beginning of the khalifat of Abdalmalec, Al Mokhtar, who had been imprisoned by the governor of Cufa, was released at the intercession of Abdallah Ebn Omar, who had married his sister. The year following, having put himself at the head of the Shiite sectaries, he sent proposals of alliance to Abdallah Ebn

Zobeir; but he, justly suspecting his sincerity, by a stratagem cut off near 3000 of his men. Upon this disaster, Al Mokhtar, fearing the house of Ali might be intimidated, sent a letter to Mahomet Ebn Hanifiyah, one of that family, in which he offered his assistance with a powerful army. This offer Mahomet declined, declaring himself only for pacific measures; but though he and all the rest of Ali's family behaved in the most peaceable manner, Abdallah did not think himself safe till they owned his authority. He therefore imprisoned them, together with 17 of the principal citizens of Cufa, whom he threatened to put to death, and afterwards burn their bodies, if they did not within a limited time take an oath of allegiance to him. Al Mokhtar being informed of the distressed situation they were in, sent a body of 750 horse to Mecca, under Abu Abdallah, to release them. That general not only executed his orders with great bravery, but took Abdallah himself prisoner, whom he would have cut to pieces on the spot, had he not been released at the intercession of Mahomet, who for the present adjusted the differences to the mutual satisfaction of all parties. After this reconciliation, Abu Abdallah, or rather Mahomet himself, distributed among 4000 of Ali's friends a sum of money brought for that purpose, in order to indemnify them for the losses they had sustained. Thus the friends of Ali were happily delivered, when only two days of the time granted them by Abdallah remained, and a sufficient quantity of wood and other combustibles was collected, in order to consume their bodies. Notwithstanding the reconciliation, however, that had lately taken place, Mahomet Ebn Hanifiyah thought proper to post himself on a mountain near Mecca with a body of 4000 men.

The Cufans having received advice before Merwan's death, that he had sent Obeidallah with a powerful army towards their city, and even given him permission to plunder it in case it should be taken, appointed Yezid Ebn Ares, a man of undaunted courage, to oppose him; but Merwan dying before Obeidallah could execute his commission, an end was put for the present to this expedition. The memory of it, however, still remained; and Al Mokhtar, to whom Obeidallah was personally obnoxious, assembled a body of troops to act offensively against him, and even against the Syrian khalif himself, in case he should support Obeidallah. Among other preparations for this enterprize, Al Mokhtar caused a kind of portable throne to be made, telling his troops, that "it would be of the same use to them that the ark was to the children of Israel." It was therefore carried on a mule before the troops that were to march against Obeidallah, and the following prayer said before it: "O God! grant that we may live long in thy obedience; help us, and do not forget us, but protect us." This expedient was so well adapted to the hot-headed enthusiasts who composed Al Mokhtar's army, that they attacked Obeidallah's camp, defeated him, and gained a complete victory. Obeidallah himself was killed in the action, his head sent to Al Mokhtar, and his body reduced to ashes.—By this victory the sectaries were rendered so formidable, that Nisbin or Nisibis, and several other cities, surrendered to them without opposition. They now began to entertain thoughts of deposing both the khalifs, and placing on the Moslem throne one of the family

Arabia.

139
Narrow e-
scape of the
family of
Ali.

140
Impiety of
Al Mokhtar.

141
Obeidallah
defeated and
killed.

Arabia.

¹⁴²
Al Mokhtar
defeated
and killed
by Mufab.

mily of Ali; but all their towering hopes were soon frustrated by the defeat and death of Al Mokhtar by Mufab brother to Abdallah Ebn Zobeir. Al Mokhtar, after being defeated in a general engagement by Mufab, fled to the castle of Cufa, where he defended himself with great bravery for some time; but being at last killed, his men, to the number of 7000, furrendered at discretion, and were all of them put to the sword on account of the outrages they had committed.

¹⁴³
Horrid
cruelties
committed
by the Azar-
akites.

The next year, the 68th of the Hegira, the Azarakites, so denominated from Nafe Ebn Al Azarak, the author of their sect, having assembled a considerable force, made an irruption into Irak. They advanced almost to the gates of Cufa, and penetrated to Al Madayen. Being sworn enemies of the house of Omniyah, and acknowledging no government spiritual or temporal, they committed terrible ravages in every part of the Moslem territories through which they passed. They carried their excesses to such a height as to murder all the people they met with, to rip open women with child, and commit every species of cruelty that could be invented upon the inhabitants without distinction. The governor of Mawlef and Mesopotamia, being informed of these unparalleled outrages, marched against them with a body of troops, and carried on a brisk war with them for eight months. During this period their leader Nafe Ebn Al Azarak died; and was succeeded by Katri Ebn Al Fojat, under whose conduct they continued their depredations. Mufab not being pleased with his lieutenant's management of the war, recalled him, and sent in his place one Omar Ebn Abdallah Temimi, who gave the Azarakites a great overthrow at Naifabur in Khorasan, put many of them to the sword, and pursued the rest as far as Ispahan and the province of Kerman. Here having received a reinforcement, they returned into the province of Ahwaz, and did incredible damage to the country through which they passed. But Omar advancing against them a second time, they retired at his approach to Al Madayen, leaving the district belonging to the city in a dreadful manner. However, Omar pursuing them thither also, they fled into the province of Kerman, and thence gradually dispersed themselves. This year there was a grievous famine in Syria, which suspended all military operations.

¹⁴⁵
Barbarity of
Abdalmalec.

The next year, being the 69th of the Hegira, Abdalmalec left Damascus, to march against Mufab. In his absence he left Amru Ebn Said governor of the city; but he immediately seized upon it for himself, which obliged the khalif to return. After several skirmishes had happened between some detachments of the khalif's troops with those of Amru, a pacification was concluded at the intercession of the women: but Abdalmalec barbarously put Amru to death with his own hand, notwithstanding his promise; and was immediately seized with such a tremor, that he lost the use of almost all his faculties, and was obliged to be laid in bed. In the mean time the palace was attacked by Yahyah, Amru's brother, at the head of 1000 slaves. After a warm dispute, they forced open the gates, killed several of the guards, and were upon the point of entering the palace, when the people within threw Amru's head among them. This so cooled their ardour, that they desisted from the attempt; and some money having been afterwards distributed among them,

Arabia.

¹⁴⁶
Disgraceful
treaty with
the Greeks.

they retired. So great, however, was Abdalmalec's avarice, that, after the tumult was appeased, he recalled all the money which had been distributed, and commanded it to be deposited in the public treasury.

In the 70th year of the Hegira, the Greeks made an irruption into Syria; and Abdalmalec having occasion for all his forces to act against Abdallah Ebn Zobeir, was obliged to pay a tribute of 1000 dinars per day, according to Theophanes, and send every year 365 slaves and as many horses to Constantinople. In this treaty it was also stipulated, that the revenues of Cyprus, Armenia, and Hiera, should be equally divided between the khalif and the Greek emperor.

¹⁴⁷
Mufab de-
feated and
killed by
Abdalmalec.

Abdalmalec, being now at leisure to pursue his intended expedition against Mufab, marched against him in person; and having arrived at Malken, a small town on the frontiers of Mesopotamia, where he was waited for by Mufab, the latter was defeated through the treachery of his troops, and himself killed. After the battle, Abdalmalec repaired to Cufa, where he was received with the utmost submission; and people of all ranks came in crowds to take the oath of allegiance to him. He then ordered vast sums of money to be distributed among them, and gave a splendid entertainment to his new subjects, to which even the meanest of them were not refused admittance. During this entertainment, the unfortunate Mufab's head was presented to the khalif; upon which one of the company took occasion to say to him, "I saw Hofein's head in this same castle presented to Obeidallah; Obeidallah's to Al Mokhtar; Al Mokhtar's to Mufab; and now at last Mufab's to yourself." This observation so affected the khalif, that, either to avert the ill omen, or from some other motive, he ordered the castle to be immediately demolished. Abdallah Ebn Zobeir, in the mean time, having received the melancholy news of the defeat and death of his brother, assembled the people of Mecca, and from the pulpit made a speech suitable to the occasion. He also did his utmost to put Mecca in a proper posture of defence, expecting a speedy visit from his formidable competitor, who now gave law to Irak, Syria, and Egypt, without controul.

Soon after Abdalmalec's return to Damascus, he appointed his brother Bashar governor of Cufa; and Khalel Ebn Abdallah, governor of Basra. The latter had no sooner entered upon his office, than he indifferently removed from the command of the army Al Mohalleb, one of the greatest generals of the age; appointing in his room Abdalaziz, who was greatly his inferior in military skill. Of this dismissal the Azarakites being informed, they immediately attacked Abdalaziz, entirely defeated him, and took his wife prisoner. A dispute arising among the victors about the price of that lady, one of them, to end it, immediately cut off her head. Upon this disaster, Khalel was commanded to replace Al Mohalleb, which he did; and having in conjunction with him attacked the Azarakites, forced their camp, and entirely defeated them.

¹⁴⁸
Azarakites
defeated.

In the 72^d year of the Hegira, Abdalmalec having no enemy to contend with but Abdallah Ebn Zobeir, made great preparations for an invasion of Hejaz, giving the command of the army to be employed on this occasion to Al Hejaz, one of his most warlike and eloquent captains. Before that general had put his army in march for Mecca, he offered his protection to all the

Arabia.

Arabia.

Arabs there that would accept of it. Abdallah being informed of the enemy's approach, sent out several parties of horse to reconnoitre, and give him intelligence of their motions. Between these and some of Al Hejjaj's advanced guards several skirmishes happened, in which Abdallah's men had generally the worst. This encouraged Al Hejjaj to send to the khalif for a reinforcement, his troops amounting to no more than 2000 men, who were insufficient for reducing Mecca. He assured him at the same time, that Abdallah's fierceness was very much abated, and that his men desisted to him daily. The khalif, upon this, ordered a reinforcement of 5000 men under the command of Tharik Ebn Amer; but, notwithstanding this additional strength, he made but little progress in the siege for some time.

749
Mecca be-
sieged by Al
Hejjaj.

While he battered the temple of Mecca with his machines, it thundered and lightened so dreadfully, that the Syrians were struck with terror, and refused to play them any longer upon that edifice. Upon this, Al Hejjaj stuck the corner of his vest into his girdle, and putting into it one of the stones that was to be discharged out of the catapults, flung it into the town, and this occasioned the recommencement of the operations. The next morning, the Syrians were annoyed by fresh storms, which killed 12 men, and quite despirited them. Al Hejjaj, however, animated them, by observing that he was a son of Tehama; that this was the storm of Tehama, and that their adversaries suffered as much as they. The day following, some of Abdallah's men were killed by a very violent storm, which gave Al Hejjaj a farther opportunity of animating his troops. At last, Abdallah, having been deserted by most of his friends, 10,000 of the inhabitants of Mecca, and even by his own sons Hamza and Khobeib, desired to know his mother's sentiments as to what course he was to take. He represented to her, that he was almost entirely abandoned by his subjects and relations; that the few who persisted in their fidelity to him could scarce enable him to defend the city any longer; and that the Syrian khalif would grant him any terms he should think fit to demand. His mother, however, being of an inflexible resolution, and not able to bear the thoughts of seeing her son reduced to the rank of a private person, being herself the daughter of Abu Beer the first khalif, advised him by no means to survive the sovereignty, of which he was on the point of being deprived. This advice being agreeable to his own sentiments, he resolved to die in defence of the place. In pursuance of this resolution, he defended the city, to the amazement of the besiegers, for ten days, though destitute of arms, troops, and fortifications. At last, having taken a final leave of his mother, and being animated by despair, he made a sally upon the enemy, destroyed a great number of them with his own hand, and was at length killed fighting valiantly upon the spot. At the last interview he had with his mother, she is said to have desired him to put off a coat of mail he had on for his defence; and, in order to inspire him with the greater fortitude, she gave him a draught in which a whole pound of musk had been infused. Al Hejjaj ordered his head to be cut off, and his body to be affixed to a cross; and by reason of the musk he had drank, the body emitted a grateful odour for several days.

By the reduction of Mecca, and the death of Abdallah Ebn Zobeir, Abdalmalec remained sole master

of the Moslem empire; he sustained a great loss however next year, in having an army of 100,000 men totally cut off by the Khazarians in Armenia. The governor, however, having marched in person against them at the head of only 40,000 men, but all chosen troops, penetrated into the heart of Armenia, defeated and dispersed a large body of the Khazarians, drove them into their temples, and reduced them to ashes. One of his generals also defeated an army of 80,000 Khazarians at the Iron or Caspian gates, and destroyed a great number of them, obliging the rest to embrace the Mahometan religion.

751
Khazarians
reduced.

Al Hejjaj, in consequence of his services, was made governor, first of Medina, and then of Irak, Khorasan, and Sijistan; in all which places he behaved with the greatest cruelty. Having entered the city of Cufa muffled up in his turban, he was surrounded by crowds of people who pressed forward to see him. He told them their curiosity would soon be gratified; which he effectually did, by ascending the pulpit, and treating them in a very coarse manner; swearing that he would make the wicked bear his own burden, and fit him with his own shoe; and telling them, among other things, that "he imagined he saw the heads of men ripe and ready to be gathered, and turbans and beards besprinkled with blood." At Basra he made a speech much to the same purpose; and, to give the inhabitants a taste of his discipline, caused one of them who had been informed against as a rebel to be beheaded on the spot, without any trial. So great indeed was the abhorrence in which he was held by those over whom he presided, that having once recommended himself to the prayers of a religious Moslem, the latter instantly prayed that it would please God to kill Al Hejjaj quickly; "for nothing, said he, could be more advantageous for himself or the people." In consequence of these cruelties, rebellions were soon raised against him; but they were easily suppressed, and Al Hejjaj continued in the full enjoyment of all his employments till he died.

752
Cruelty of
Al Hejjaj.

In the 76th year of the Hegira, one Saleh Ebn Marj, a hot-headed enthusiast, and Shebib Ebn Zeid, a Kharejite, took up arms against the khalif. They had conspired against him the year before, when on a pilgrimage to Mecca; and Al Hejjaj had been ordered to seize them: but at that time they found means to make their escape; and having now assembled about 120 men, Saleh was proclaimed emperor of the faithful at Daras in Mesopotamia. The governor soon received intelligence of their motions; and ordered a body of 500 men, under the command of one Adi, to march against them: but that general, being afraid to attack them notwithstanding his superiority in numbers, demanded a reinforcement. He therefore was supplied with 500 more troops, with which he advanced to Daras: but being still afraid of the rebels, he entered into negotiations with them; during which they attacked him, entirely defeated his army, and made themselves masters of his camp. Upon this the governor sent a detachment of 1500 horse against them; but the rebels, notwithstanding the smallness of their number, defended themselves in such a manner, that the khalif's troops were forced to dismount, and fight on foot. The engagement continued till night; when the rebels, finding themselves unable to contend with such numbers, reti-

753
Saleh and
Shebib re-
bel.

754
Their bra-
very.

red

750
Abdallah
killed.

Arabia.

Arabia.

red to Mawfel. After this, Al Hejaj being informed that they had taken post at Dascara, sent against them an army of 5000 men. The rebels, hearing of this formidable army, abandoned their camp; but were so closely pursued, that they found themselves obliged to stand an engagement at Modhaj, a small village on the Tigris. Saleh's forces, consisting only of three companies of 30 men each, were soon thrown into disorder, and himself killed: but Shebib made an excellent retreat to a neighbouring castle; from whence he sallied out at midnight on the khalif's forces, penetrated to the very heart of the camp, where he wounded the general himself, and dispersed the greatest part of his army.

256
Al Hejaj de-
feated by
Shebib.

After this victory, the rebels became terrible even to Al Hejaj himself, whom they afterwards defeated in several engagements, and, taking advantage of his being at Basra, made themselves masters of Cufa with little opposition. Al Hejaj was now constrained to write to the khalif for a strong detachment of the Syrian troops, with which he advanced against Shebib, whose army bearing no proportion to that of Al Hejaj, the former was totally defeated, had his wife's brother killed in the action, and was obliged to fly into Kerman. Having refreshed his men in this province, he again advanced to Ahwaz, where he was met by one of Al Hejaj's generals at the head of the Syrian army. Shebib defended himself with incredible valour, and several times repulsed the khalif's forces; but being overpowered by numbers, as his army consisted of no more than 600 men, he was at last put to flight, and, in passing a bridge was thrown off by his horse and drowned. His body was drawn up by a net, and the head sent to Al Hejaj, who was not a little pleased at the sight. After his death, the rebels quarrelled among themselves, so that the khalif's troops cut off the greatest part of them. The remainder, under Katri Ebn Fojat, fled to Tabrestan. Here they were kindly received by Ashid the king, who assigned them a part of his territories for their habitation. Here they had not been long settled, before they insisted upon Ashid's either embracing Mahometanism, or paying them an annual tribute; which he refusing, they drove him into Irak, where he implored the khalif's protection. Ashid afterwards conducted a body of Moslem troops into Tabrestan, where they fell upon the rebels with such fury, that they killed Katri himself, cut a great number of his men to pieces, and took all the rest prisoners.

258
Ingratitude
of the re-
bels.

259
They are all
slain.

This year also (the 76th of the Hegira), money was first coined in Arabia. Before this time, the dinars, or gold coins, had Greek inscriptions; and the dirhems, or silver ones, Persian inscriptions. The first erection of a mint in Arabia was occasioned by the following accident. Abdalmalec added to the letters he wrote to the Greek emperor, this short passage of the Koran, "Say, God is one," or "Say there is one God;" and then inserted the year of the Hegira, with the name of the prophet, in such a manner as gave the emperor great offence. Upon this, he wrote to Abdalmalec, desiring him to alter that manner of writing, or he would send him some coins in which the name of Mahomet should be mentioned in such a manner as would not prove very agreeable. Abdalmalec now resolved to coin money of his own; and accordingly some dirhems were this year stamped by Al Hejaj, with the inscription, *Allah Samad*, "God is eternal;"

which gave great offence to the superstitious Moslems, as they imagined that the name of God would be thereby profaned by the touch of unclean persons.

In the 77th year of the Hegira, the Arabs made an incursion into the imperial territories, and had Lazica and Bernucium betrayed to them; and the next year they made themselves masters of Africa Propria, demolishing the city of Carthage so effectually, that scarce a vestige of it was left. They were soon driven out, however, by John the Patrician, a man of great valour and experience in war; but returning with a superior force, they obliged John in his turn to fly to Constantinople.

261
Carthage
demolished.

The 79th year of the Hegira is remarkable for nothing but the rebellion of Abdalrahman in Persia; who drove the *Khakan*, or emperor of the Turks, Tartars, or Moguls, out of that country: but the following year, one of the Greek generals, named *Heraclius*, penetrated into Syria as far as Samofata, and destroyed 200,000 Arabs, ravaging the country in a terrible manner; and Abdalrahman was defeated and killed by Al Hejaj, after a great number of engagements, some say 81, and others 100. In the 83^d year of the Hegira, the nobility of Armenia revolting, drove the Arabs out of that province; but Mahomet, one of the khalif's generals, entering the country with a powerful army, got the authors of the revolt into his hands, and caused them all to be burnt alive. Encouraged by this success, the Moslems invaded Cilicia under one Azar; but were, to the number of 10,000, cut in pieces by Heraclius; and the next year, having again entered that country, 12,000 of them were destroyed by the same general, and the rest forced to fly into their own country.

262
200,000 A-
rabs de-
stroyed by
Heraclius.

In the 86th year of the Hegira died the khalif Abdalmalec, after a reign of 21 years. He is said to have had such a stinking breath, that the flies which accidentally settled on his lips were almost instantly struck dead by it. He was succeeded by Al Walid, who greatly extended the Moslem dominions. The first year of his reign, one of his generals having passed the Oxus, (now the Jihum), defeated a numerous army of Turks and Tartars. He then over-ran and entirely reduced the countries of Sogd or Sogdiana, Bagrafa, Shash, Targana, and the whole immense tract going under the name of Mawaralnahr, or Great Bukharia. He also conquered the Khan of Khowarazm, obliging him to pay an annual tribute of two millions of dinars. About the same time another general, called *Mahomet*, made an irruption into India, and subdued a considerable part of that country. He also entirely subdued the kingdom of Al Sind, lying between Persia and India. In this expedition, Derar king of Al Sind was defeated and killed, and had his head cut off by Mahomet.

263
Abdalmalec
dies.

263
Prodigious
conquests of
the Mo-
toms.

In the 90th year of the Hegira, the Moslems made an irruption into Cappadocia, defeated the emperor's army who opposed them, and took the city of Tyana. The next year they made another incursion into the imperial territories, whence they carried off vast numbers of slaves; and the year following, one Othman penetrated into the heart of Cilicia, where he made himself master of several cities, but does not appear to have long kept his conquests.

In the 93^d year of the Hegira, answering to that of Christ 712, Tarek Ebn Zarka made a descent on Spain, 165
They make
a descent on
Spain,

260
Money first
coined in A-
rabia.

Arabia.

Spain, defeated Roderic the last king of the Goths, reduced the city of Toledo, and over-ran a considerable part of the kingdom. Being afterwards joined by Musa, commander of the African Moslems, the two generals made themselves masters of most of the fortresses, subjugating in a manner the whole country, and obliging it to pay tribute to the khalif. In these expeditions the Moslems acquired spoils of immense value; and, amongst other things, an exceeding rich table, called by the Arab writers "the table of Solomon the son of David." According to these writers, this table consisted entirely of gold and silver, and was adorned with three borders of pearls; but Roderic of Toledo, a Spanish historian, says it consisted of one entire stone, of a green colour, and of an immense size, having no less than 365 feet. He adds, that it was found in a certain village or town, near the mountain called in his days *Jibal Soliman*, or "the mountain of Solomon."

After Musa and Tarik had committed dreadful depredations in Spain, they were both recalled by the khalif; but the next year, Tarik having undertaken another expedition into the same country, landed a body of 12,000 men at Gibraltar, with which he plundered the whole province of Bætica, and over-ran the greatest part of Lusitania. Roderic hearing of these depredations, sent against him an army of raw undisciplined troops, who were easily defeated, and most of them left dead on the spot; which so animated the Arab commander, that he resolved not to lay down his arms till he had made an absolute conquest of Spain. About the same time that Tarif made such progress in Spain, another Moslem general entered Píñia with a powerful army, took the city of Antioch, and, after having ravaged the country, retired into the khalif's territories with very little loss.

In the 95th year of the Hegira, died Al Hejaj governor of Irak, &c. after he had presided over that country 20 years. He exercised such cruelties upon those who were in subjection to him, that he is said to have killed 120,000 men, and to have suffered 50,000 men and 30,000 women to perish in prison. To excuse this cruelty, he used frequently to say, That a severe, or even violent government, is better than one too weak and indulgent; as the first only hurts particular persons, but the latter the whole community. This year also the Arabs gained a complete victory in Spain over Roderic king of the Goths, who perished in the action. In this campaign, Tarif possessed himself of immense treasures; by which means he was enabled to reward not only his officers, but common soldiers also. In the eastern parts of the world also, the Arabs were this year very formidable; Moslema, an Arab general, having entered the imperial territories, ravaged the whole province of Galatia, carrying off with him many rich spoils, and a vast number of prisoners. The Greek emperor, hearing that Al Walid designed to attack him both by sea and land, sent some of his nobles to treat of a peace; and, among other things, desired them to bring him a particular account of the force with which the khalif designed to invade the Greek empire. This they represented as so terrible, that it would be next to impossible to oppose it. The emperor therefore caused a great number of light ships to be built, the walls to be repaired, and ordered such

of the citizens as had not laid up provisions for three years to depart the city. Al Walid, in the mean time, continued his warlike preparations with the utmost vigour, being determined to make himself master of Constantinople in a single campaign.

In the 96th year of the Hegira died the khalif Al Walid, and was succeeded by his brother Soliman. This year the Moslem conquests on the east side were increased by the reduction of Tabresien and Jurjan or Georgiana. In Spain also, the city of Toledo which had revolted was reduced, and Cæsar-Augusta, now Saragossa, as well as several others. The next year Moslema set out for Constantinople, which he besieged without success till the 99th year of the Hegira; at which time he was obliged to return, after having lost before it 120,000 men. The soldiers were reduced to the greatest extremities of hunger, being forced to live upon hides, the roots and bark of trees, the most noisome animals, and even the dead bodies of their companions. This year also (the 99th of the Hegira) is remarkable for the death of the khalif Soliman. According to some, he was poisoned by Yezid his brother, governor of Persia, who was displeased with his having appointed his cousin-german Omar Ebn Abdalaziz as his successor, to the exclusion of himself. According to others, he died of an indigestion; which is not greatly to be wondered at, if, as those authors say, he used to devour 100 pounds weight of meat every day, and dine very heartily after eating three lambs roasted for breakfast. In the latter part of his reign, the Moslems were by no means successful in Spain; the kingdom of Navarre being founded at this time by Pelagius, or Pelayo, whom the Arabs were never able to reduce.

The new khalif Omar Ebn Abdalaziz was by no means of a martial character; but is said to have been very pious, and possessed of very amiable qualities. He suppressed the usual malediction, which was solemnly pronounced by the khalifs of the house of Ommiyah, against the house of Ali; and always shewed great kindness to the latter. He was poisoned by Yezid, after a short reign of two years and five months. It is related, as an instance of this khalif's humility, that when Moslema visited him in his last sickness occasioned by the poison, he lay upon a bed of palm-tree leaves, supported by a pillow formed of beasts skins, and covered with an ordinary garment. He had also on a dirty shirt; for which Moslema blamed his sister Fatima, Omar's wife; but she excused herself, by telling, him that the emperor of the faithful had not another shirt to put on.

Concerning Yezid the successor of Omar we find very little worth mentioning. He did not long enjoy the dignity he had so iniquitously purchased, dying after a reign of little more than four years. He died of grief for a favourite concubine, named *Hababah*, who was accidentally choked by a large grape which stuck in her throat.

Yezid was succeeded by his brother Hesham, who ascended the throne in the 105th year of the Hegira. In the second and third year of his reign, several incursions were made into the imperial territories, but generally without success. In the 105th year of the Hegira, Moslema drove the Turks out of Armenia and Aderbijan, and again confined them within the Caspian gates.

Arabia.

168

Al Walid dies and is succeeded by Soliman.

169

Constantinople unsuccessfully besieged.

170

Death of Soliman.

177

New khalif poisoned.

175

The Turks defeated.

166
And over-ran the whole country.

167
Al Hejaj dies.

Arabia.

Arabia.

173
France in-
vaded by the
Arabs.174
They are ut-
terly defeat-
ed by Char-
les Martel.175
Reign of
Merwan.

gates. The next year, he obliged them to take an oath that they would keep their own country; but this they soon violated, and were again driven back by Moslemea. About this time also the Arabs, having passed the Pyrenees, invaded France to the number 400,000, including women and slaves, under the command of one Abdalrahman. Having advanced to Arles upon the Rhone, they defeated a large body of French that opposed them; and having also defeated count Eudo, they pursued him through several provinces, wasted the whole country with fire and sword, making themselves masters of the city of Tours, most of which they reduced to ashes. Here however a stop was put to their devastations by Charles Martel; who, coming up with them near the abovementioned city, engaged them for seven days together, and at last gave them a total overthrow. The French general made himself master of all their baggage and riches; and Abdalrahman, with the shattered remains of his army, reached the frontiers of Spain with the utmost difficulty. The following year also, according to some historians, the Arabs were overthrown at Illiberia, scarce any of them making their escape. To make amends for this bad fortune, however, the khalif's arms were successful against the Turks, who had again invaded some of the eastern provinces.

In the 125th year of the Hegira died the khalif Hesham, after a reign of 19 years, seven months, and eleven days. He was succeeded by Al Walid II. who is represented as a man of a most dissolute life, and was assassinated the following year on account of his professing *Zendicism*, a species of infidelity nearly resembling Sadducism. He was succeeded by Yezid the son of Al Walid I. who died of the plague after a reign of six months; and was succeeded by Ibrahim Ebn Al Walid, an imprudent and stupid prince. He was deposed in the 127th year of the Hegira by Merwan Ebn Mahomet, the governor of Mesopotamia; who gave out as an excuse for his revolt, that he intended to revenge the murder of the khalif Al Walid II. He was no sooner seated on the throne, than the people of Hems rebelled against him. Against them the khalif marched with a powerful army; and, asking them what could excite them to this rebellion, summoned them to surrender. They assured him that they were disposed to admit him into their city; and, accordingly, one of the gates being opened, Merwan entered with about 300 of his troops. The men that entered with him were immediately put to the sword; and the khalif himself escaped with great difficulty. However, he afterwards defeated them in a pitched battle, put a great number of them to the sword, dismantled the city, and crucified 600 of the principal authors of the revolt.

This however was far from quieting the commotions in different parts of the empire. The inhabitants of Damascus soon followed the example of those of Hems, and deposed the khalif's governor; but Merwan, immediately after the extinction of the former rebellion, marched to Damascus with great celerity, entered the city by force, and brought to condign punishment the authors of the revolt. Peace, however, was no sooner established at Damascus, than Soliman Ebn Hesham set up for himself at Basra, where he was proclaimed khalif by the inhabitants. Here he assembled an army of 10,000 men, with whom he marched to Kinniffin,

where he was joined by vast numbers of Syrians who flocked to him from all parts. Merwan, receiving advice of Soliman's rapid progress, marched against him with all the forces he could assemble, and entirely defeated him. In this engagement Soliman lost 30,000 men, so that he was obliged to fly to Hems, where 900 men took an oath to stand by him to the last. Having ventured however to attack the khalif's forces a second time, he was again defeated, and forced to fly to Hems. But being closely pursued by Merwan, he constituted his brother Said governor of the city, leaving with him the shattered remains of his troops, and himself fled to Tadmor. Soon after his departure Merwan appeared before the town, which he besieged for seven months; during which time he battered it incessantly with 80 catapults. The citizens being reduced to the last extremity, surrendered, and delivered Said into the khalif's hands. In consideration of this submission Merwan pardoned the rebels, and took them all under his protection. About the same time, another pretender to the khalifat appeared at Cufa; but Merwan took his measures so well, that he extinguished this rebellion before it could come to any height.

Notwithstanding the success, however, that had hitherto attended Merwan, a strong party was formed against him in Khorasan by the house of Al Abbas. The first of that house that made any considerable figure was named *Mahomet*, who flourished in the reign of Omar Ebn Abdalaziz. He was appointed chief of the house of Al Abbas, about the 100th year of the Hegira; and is said to have prophesied, that, after his death, one of his sons named *Ibrahim* should prebide over them till he was killed, and that his other son Abdallah, surnamed *Abul Abbas Al Saffah*, should be khalif, and exterminate the house of Ommyiah. Upon this, Al Saffah was introduced as the future sovereign, and those present kissed his hands and feet.

After the decease of Mahomet, his son Ibrahim nominated as his representative in Khorasan one Abu Moslem, a youth of 19 years of age; who, beginning to raise forces in that province, Merwan dispatched against him a body of horse under the command of Nafr Ebn Sayar: but that general was entirely defeated by Abu Moslem, and the greatest part of his men killed. The next year (the 128th of the Hegira), Merwan made vast preparations to oppose Abu Moslem, who after the late victory began to grow formidable to several parts of the empire. According to some authors, Merwan gained two victories over some of Ibrahim's generals: but the year following, Abu Moslem brought such a formidable army into the field, that the khalif's troops could not make head against them; his officers in Khorasan therefore were obliged either to take an oath of allegiance to Ibrahim, or to quit the province within a limited time.

In the 130th year of the Hegira, the khalif's general Nafr, having drawn together another army, was again defeated by Kahtaba another of Ibrahim's generals, and forced to fly to Raya, a town of Dylam, according to some, or of Khorasan, according to others. The next year Ibrahim, having foolishly taken it into his head to go on a pilgrimage to Mecca, attended by a numerous retinue splendidly accoutred, was seized and put to death by Merwan; and the year following, Abul Abbas was proclaimed khalif at Cufa. As soon

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Merwan's
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as the ceremony was ended, he sent his uncle Abdallah with a powerful army to attack Merwan's forces that were defeated near Tubar, at a small distance from Mosul, where that khalif was then waiting for an account of the success of his troops under Yezid governor of Irak against Khatabba, one of Al Saffah's generals. Khatabba, receiving advice of Yezid's approach, immediately advanced against him, and entirely defeated him; but, in crossing the Euphrates, the waters of which were greatly swelled, he was carried away by the current, and drowned. The pursuit, however, was continued by his son Hamid, who dispersed the fugitives in such a manner that they could never afterwards be rallied. At the news of this disaster, Merwan was at first greatly dispirited; but soon recovering himself, he advanced to meet Abdallah. In the beginning of the battle, the khalif happened to dismount; and his troops perceiving their sovereign's horse without his rider, concluded that he was killed, and therefore immediately fled; nor was it in the power of the khalif himself to rally them again, so that he was forced to fly to Damascus: but the inhabitants of that city, seeing his condition desperate, shut their gates against him. Upon this he fled to Egypt, where he maintained himself for some time; but was at last attacked and killed by Saleh, Abdallah's brother, in a town of Thebair, called *Bisr Kuridas*. The citizens of Damascus, tho' they had shamefully deserted Merwan, refused to open their gates to the victors; upon which Saleh entered the city by force, and gave it up to be plundered for three days by his soldiers.

By the total defeat and death of Merwan, Al Saffah remained sole master of the Moslem throne; but we hear of no very remarkable events that happened during his reign: only that he massacred great numbers of the partisans of the house of Ommyyah; and that Constantine Copronymus, taking advantage of the intestine divisions among the Moslems, ravaged Syria. The khalif died of the small-pox in the 136th year of the Hegira, in the 33^d year of his age; and was succeeded by his brother Al Manfur. In the beginning of Al Manfur's reign, hostilities continued against the house of Ommyyah, who still made resistance, but were always defeated. Abdallah, however, the khalif's uncle, caused himself to be proclaimed khalif at Damascus; and having assembled a powerful army in Arabia, Syria, and Mesopotamia, advanced with great expedition to the banks of the Masius near Nisibis, where he encamped. Al Manfur, being informed of this rebellion, dispatched Abu Moslem against Abdallah. This general, having harassed him for five months together, at last brought him to a general action; and, having entirely defeated him, forced him to fly to Basra. Notwithstanding all his services, however, Abu Moslem was soon after ungratefully and barbarously murdered by Al Manfur, on some ridiculous pretences of being deficient in respect towards him.

After the death of Abu Moslem, one Sinan a Magian, or adorer of fire, having made himself master of that general's treasures, revolted against the khalif; but he was soon defeated by Jamhur Ebn Morad, who had been sent against him with a powerful army. In this expedition Jamhur having acquired immense riches, the covetous disposition of the khalif prompted him to send a person express to the army to seize upon all the

wealth. This so provoked Jamhur, that he immediately turned his arms against his master; but was soon defeated, and entirely reduced. The following year (the 139th of the Hegira), one Abdalrahman, of the house of Ommyyah, after the entire ruin of that family in Asia, arrived in Spain, where he was acknowledged khalif; nor did he or his descendants ever afterwards own subjection to the Arabian khalifs.

The 140th year of the Hegira is remarkable for an attempt to assassinate the khalif. This attempt was made by the Rawandians; an impious sect, who held the doctrine of metempsychosis or transmigration.—They first offered Al Manfur divine honours, by going in procession round his palace, as the Moslems were wont to do round the Caab; but the khalif, highly incensed at this impiety, ordered 100 of the principal of them to be imprisoned. These however were soon released by their companions; who then went in a body to the palace with an intention to murder their sovereign: but he being a person of uncommon bravery, though he was surprized with very few attendants, mounted a mule, and advanced towards the mutineers with an intention to sell his life as dear as possible. In the mean time, Maan Ebn Zaidat, one of the chiefs of the Ommyian faction, who had concealed himself in order to avoid the khalif's resentment, sallied out of his retreat, and putting himself at the head of Al Manfur's attendants, charged the rebels with such fury, that he entirely defeated them. This generosity of Maan was so remarkable, that it afterwards passed into a proverb. On this occasion 6000 of the Rawandians were killed on the spot, and the khalif delivered from instant death: he was, however, so much disgusted with the Arabs on account of this attempt, that he resolved to remove the capital of his empire out of their peninsula; and accordingly founded a new city on the banks of the Tigris, which from that time to this has been known by the name of *Bagdad*. The foundations of it were laid in the 145th year of the Hegira, and finished four years after.

On the removal of the seat of government to Bagdad, the peninsula of the Arabs seems all at once to have lost its consequence, and in a short time the inhabitants seem even to have detached themselves from the jurisdiction of the khalifs: for, in the 156th year of the Hegira, while Al Manfur was yet living, they made irruptions into Syria and Mesopotamia, as if they had designed to conquer these countries over again for themselves; and though the Arabs, properly so called, continued nominally subject to the khalifs of Bagdad till the abolition of the khalifat by Hulaku the Tartar, yet they did not become subject to him when he became master of that city. Nay, we have the strongest reason to believe that the Arabs (i. e. the inhabitants of the peninsula properly called *Arabia*) have remained independent, not only of Hulaku, but of every other conqueror that the world hath yet produced. To prove this will require no long time: for no governor of Arabia is mentioned in history but what was chosen by the Arabs themselves; which abundantly shews the futility of the pretences to conquests of Arabia made by Trajan, Severus, the Turks, &c. From the character of the Arabs in all ages, it is certain that no nation ever had more occasion for governors than they have; and if the princes who pretended to conquer them did not appoint

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Abdalrahman proclaimed khalif in Spain.

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Attempt to assassinate the khalif.

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Merwan himself defeated.

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And killed.

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Reign of Al Manfur.

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He murdered Abu Moslem.

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He removed the seat of empire to Bagdad.

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Arabs never subdued by any foreign power.

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point governors over those unruly subjects, we can only suppose it to have been because they were not able, *i. e.* because their pretended conquests were never made. As the history of *Arabia*, properly so called, therefore, is not to be found in the history of the khalifs of Bagdad, we must refer our readers for the history of those khalifs to the article *BAGDAD*, and conclude this long article with some account of the manners, customs, &c. of the Arabs, and which, according to all accounts, seem now to be much the same with what they have always been.

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Character of
the ancient
Arabs.

With regard to the disposition of the ancient Arabs, it will be proper to remark, that they had their good and bad qualities, their excellencies and defects, as well as other nations. Hospitality was so habitual to them, that in this they seem to have exceeded all their neighbours. Agatharchides represents them as the most hospitable people in the world to all nations, but particularly some of the Greeks. Hatem of the tribe of Tay, and Hafsi of that of Fezarah, were principally famous on this account: the latter of these, we are told, fell into as great a transport of joy when he conferred any signal favour upon a petitioner, as others did when they received such a favour. Nay, the contrary vice was so much in contempt among the Arabs, that a certain poet upbraids the inhabitants of Wafet, as with the greatest reproach, that none of their men had the heart to give, nor their women to deny. As a mark of their hospitable disposition, the Arabs used to light fires on the tops of hills, which in the night conducted travellers to their tents, and assured them of a kind reception. Every one of these fires they called *the fire of hospitality*; and the larger and higher it was, the greater honour and glory it reflected on the person or persons concerned in lighting it. The highest compliment that could be paid a man was to pass an encomium upon his munificence; as that most acceptable to a woman was, to celebrate her parsimony, and her beauty. The ancients likewise commend the Arabs for being exact to their words, and respectful to their kindred; and they have always been celebrated for their quickness of apprehension and penetration, as well as the vivacity of their wit; especially those of the Desert.

On the other hand, that the Arabs had a natural inclination to war, bloodshed, cruelty, and rapine, is acknowledged by their own writers. They had always been so much addicted to bear malice, that they scarce ever forgot an old grudge; in which vindictive temper, some physicians say, ought to be attributed to their frequent feeding on camels flesh, that creature being most malicious, and tenacious of anger. This account, according to Mr Sale, suggests a good reason for distinction of meats.

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Present A-
rabs deseri-
ved.

The present Arabs are of a middle stature, thin, and of a swarthy complexion, with black hair and black eyes, which however are common to them with other people in the same climate. Their voices are rather effeminate than strong. They are very swift of foot, and excellent horsemen; and are said to be a brave people, expert at the bow and lance, and, since they became acquainted with fire-arms, good marksmen.

The habit of the roving Arabs is a kind of blue shirt, tied about them with a white sash or girdle; and some of them have a vest of furs, or sheep-skins, over it. They wear also drawers, and sometimes slippers, but no Rock-

ings, and have a cap or turban on their heads. Many of them go almost naked; but the women are so wrapped up, that nothing can be discerned but their eyes.

Except those that live in the cities and towns on the sea-coasts, they have no settled habitation, but rove from place to place, with their flocks and herds, for the conveniency of water and pasture. While they continue in any particular spot, they live and sleep in tents. They frequently rob or impose a tribute upon the caravans between Turkey and Persia; and the king of Muscat is little better than a pirate, having generally a squadron of cruisers, with which he takes all the defenceless ships he can meet with in the Persian and Arabian seas. They pretend, that God gave permission to Ishmael and his posterity to take whatever they could, especially from the Jews.

The food of the Arabs is chiefly rice, fish, herbs, venison, fowl, and most other sorts of flesh: but camels flesh is most admired; and they take care to drain the blood from the flesh, as the Jews do, and, like them, abstain from such fish as have no scales. Their drink is chiefly water or sherbet; they have no strong liquors.

Dr Shaw says, the wild Arabs (by which we suppose he means the wandering Arabs) are a very fierce, rapacious, unpolished race, without the least literature among them; that Europeans have little or no converse with them; and, if they had, could learn but little of them.

Though the far greater part of the nation deserves the character given of them above, yet there are many of them, especially such as live in towns, that apply themselves to trades and commerce, arts and sciences, in which they often make a great progress; being naturally ingenious, subtle, and witty; and great admirers of poetry, music, and rhetoric. Many of the Arabian performances in physics, astronomy, and mathematics, shew the authors to have been men of great genius and application. Figures, and the curious disposition of them, so as to express any number whatsoever with ease and expedition, is allowed to be an invention of the Arabians. To conclude their character, both sexes are said to be very vindictive, and excessively given to lust, as the natives of hot climates generally are. How strong the Arab genius is tinctured with enthusiasm and superstition, and consequently inclined to fable and romance, appears eminently in most of their compositions.

As the Arabs are one of the most ancient nations in the world, having inhabited the country they at present possess almost from the deluge, without intermixing with other nations, or being subjugated by any foreign power, their language must have been formed soon after, if not at, the confusion of Babel. The two principal dialects of it were, that spoken by the Hamyarites and other genuine Arabs, and that of the Koreish, in which Mahomet wrote the Koran. The first is styled by the Oriental writers the *Arabic of Hamyar*, and the other *the pure or desecrated*. As Yarab, grandfather of Hamyar, is supposed by the Oriental writers to have been the first whose tongue deviated from the Syriac to the Arabic; the Hamyaritic dialect, according to them, must have approached nearer to the purity of the Syriac; and consequently have been more remote from the true genius of the Arabic, than that of any other tribe. The dialect of the Koreish, termed by the Koran *the*

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Their lan-
guage.

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perspicuous and clear Arabic, is referred to *Ihmael* as its author; who, say the above-mentioned writers, first spoke it; and, as Dr Pocock believes, after he had contracted an alliance with the family of *Jorham* by marriage, formed it of their language and the original Hebrew. As, therefore, the *Hamyaritic* dialect partook principally of the *Syriac*, so that of the *Koreish* was supposed to consist chiefly of the Hebrew. But, according to *Jallalo'ddin*, the politeness and elegance of the dialect of the *Koreish* ought rather to be attributed to their having, from the remotest antiquity, the custody of the *Caaba*, and dwelling in *Mecca* the centre of Arabia. The Arabs are full of the commendations of their language; which is very harmonious, expressive; and, as they say, so immensely copious, that no man uninspired can be a perfect master of it in its utmost extent. How much, in this last article, it is superior to the Greek and Latin tongues, in some measure appears from hence, that sometimes a bare enumeration of the Arabic names of one particular thing, and an explication of them, will make a considerable volume. Notwithstanding this, the Arabs believe the greatest part of their language to be lost; which will not seem improbable, when we consider how late the art of writing became generally practised among them. For though it was known to *Job* their countryman, to the *Edomites*, as well as the other Arabian nations bordering upon *Egypt* and *Phœnicia*, and to the *Hamyarites* many centuries before *Mahomet*, as appears from some ancient monuments said to be remaining in their character; yet the other Arabs, and those of *Mecca* in particular, unless such of them as were either Jews or Christians, were to the time of *Moramer* perfectly ignorant of it. It was the ancient Arabic language preceding the reign of *Justinian*, which so nearly resembled the *Ethiopic*; for since that time, and especially since the age of *Mahomet*, all the Arabic dialects have been not a little corrupted. This is now the learned language of the *Mahometans*, who study it as the European Christians do the Hebrew, Greek, and Latin.

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Letters.

The character used by them, the most ancient of any peculiar to the Arabs, wherein the letters were not distinctly separate, went by the appellation of *Al Mofnad*, from the mutual dependency of its letters or parts upon one another. This was neither publicly taught, nor suffered to be used, without permission first obtained. Could we depend upon what *Al Firauzabadi* relates from *Ebn Hafssem*, this character must have been of a very high antiquity; since an inscription in it, according to the last author, was found in *Yaman*, as old as the time of *Joseph*. Be that as it will, *Moramer Ebn Morra* of *Anbar*, a city of *Irak*, who lived not many years before *Mahomet*, was the inventor of the present Arabic character, which *Bashar* the *Kendian*, who married the sister of *Abu Sofian*, is said to have learned from the house of *Anbar*, and to have introduced at *Mecca* but a little time before the institution of *Mahometism*. *Moramer's* alphabet the Oriental authors agree to have been very different from the ancient one of the *Hamyarites*, since they distinguish the *Hamyaritic* and Arabic pens. In *Mahomet's* time, the *Morameric* alphabet had made so small a progress, that no one in *Yaman* could either write or read it; nay, *Mahomet* himself was incapable of doing either; for which

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reason, he was called the *illiterate prophet*. The letters of this alphabet were very rude; being either the same with, or very much like, the *Cufic*; which character is still found in inscriptions and the titles of ancient books; nay, for many years it was the only one used by the Arabs, the *Koran* itself being at first written therein. In order to perpetuate the memory of *Moramer's* invention, some authors call the Arabic letters *Al Moramer*, i. e. the progeny of *Moramer*. The most remarkable specimens of the *Cufic* character (so denominated from *Cufa*, a city of *Irak*, where some of the first copies of the *Koran* were written) are the following: Part of that book in it on vellum, brought from *Egypt* by *Mr Greaves*; some other fragments of the same book in it published by *Sir John Chardin*; certain passages of a MS. in the *Bodleian* library; the legends on several *Saracenic* coins dug up not many years ago on the coast of the *Baltic*, not far from *Dantzick*; and, according to *Mr Professor Hunt*, those noble remains of it that are, or were lately, to be seen in *Mr Joseph Ames's* valuable collection of antique curiosities. As to the true origin of the ancient and modern Arabic alphabets, we must own ourselves pretty much in the dark.

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Learning,
&c.

The sciences chiefly cultivated by the ancient Arabians were three; that of their history and genealogies, such a knowledge of the stars as to foretell the changes of weather, and the interpretation of dreams. They valued themselves extremely on account of the nobility of their families; and so many disputes happened on that occasion, that it is no wonder if they took great pains in settling their descents. Their knowledge of the stars was gathered from long experience, and not from any regular study or astronomical rules. The Arabians and Indians applied themselves to observe the fixed stars, contrary to other nations, whose observations were almost confined to the planets; and they foretold their effects from their influences, not their nature. The stars or asterisms they most usually foretold the weather by, were those they call *Anwaa*, or the houses of the moon. These are 28 in number, and divide the zodiac into as many parts, through one of which the moon passes every night. As some of them set in the morning, others rise opposite to them, which happens every thirteenth night; and from their rising and setting, the Arabs, by long experience, observed what changes happened in the air; and at length came to ascribe divine power to them, saying, that their rain was from such or such a star. This expression *Mahomet* absolutely forbade them to use in the old sense, unless qualified in such a manner as to make the Supreme Being the director and manager of them. We find *Al Rayeih*, one of the kings of *Yaman*, surnamed the *Philosopher*, not so much on account of his learning, as of his great prudence and intellectual endowments. That the Arabs understood something of physics before the time of *Mahomet*, appears from hence, that the famous Arabian physician *Al Harith Ebn Khaldi*, so celebrated amongst his countrymen, was older than that impostor. They seem to have made no farther progress in astronomy, which they afterwards cultivated with so much success and applause, than to observe the influence of the stars upon the weather, and to give them names; which it was obvious for them to do, by reason of their pastoral way of life, lying night and day in the open plains. The names they imposed on the stars

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stars generally alluded to cattle and flocks; and they were so nice in distinguishing them, that no language has so many names of stars and asterisms as the Arabic.

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Mechanical
arts.

That some of the Arabs had a good degree of knowledge in several mechanical arts, appears from Strabo, who informs us, that the people of Tanna and the adjacent provinces had magnificent temples, and elegant houses, built in the Egyptian taste. The same author likewise relates, that in Arabia Felix, besides the husbandmen, there were many artificers; and, amongst others, those which made palm-wine, which, he intimates, was much used by the Arabs. As for the exercise of arms and horsemanship, they looked upon this as one of their principal accomplishments, being obliged to practise and encourage it by reason of the independency of their tribes, whose frequent jarring made wars almost continual amongst them, which for the most part ended in field-battles. Hence it became an usual saying amongst them, that God had bestowed four peculiar things on the Arabs, viz. *turbans instead of diadems, tents instead of walls and houses, swords instead of intrenchments, and poems instead of written laws.* The principal arms used by the ancient Arabs were bows and arrows, darts or javelins, and broad swords or scymetars. The bows and arrows were the most ancient of these; being used by Ishmael himself, according to Scripture. It is probable also, that some of them were acquainted with every branch of the military art cultivated by their neighbours the Egyptians, Syrians, and Phenicians.

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Religion.

The religion of the Arabs before Mahomet, which they call the *state of ignorance*, was chiefly gross idolatry; the Sabian religion having almost over-run the whole nation; though there were also great numbers of Christians, Jews, and Magians, amongst them. The idolatry of the Arabs, as Sabians, chiefly consisted in worshipping the fixed stars and planets, and the angels and their images; which they honoured as inferior deities, and whose intercession they begged as their mediators with God. For they acknowledged one Supreme God, the Creator and Lord of the universe, whom they called *Allah Ta'ala*, the most high God; and their other deities, who were subordinate to him, they called simply *Al Ilahât*, i. e. the goddesses.

Of the angels or intelligences which they worshipped, we find only three mentioned in the Koran, viz. *Azrail*, *Al-Uzza*, and *Manab*: these they called *goddesses*, and the daughters of God; an appellation they gave not only to angels, but also to their images, which they believed either to be inspired with life by God, or else to become the tabernacles of the angels, and to be animated by them; and they paid them divine honours, because they believed them to intercede with God for their votaries. The Arab Sabians likewise, in common with those of other nations, imagined that the sun, moon, and fixed stars, were inhabited by intelligences of a middle nature betwixt men and the supreme Being, who actuated their orbs in the same manner as the soul does the human body; and that this was the true cause of all their motions. These beings, they had a notion, became mediators between God and them: for the necessity of a mediator they clearly discovered from the beginning; and therefore to them, as God's mediators, directed divine worship. They first worshipped

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them by their tabernacles, i. e. their orbs themselves; but these, by their rising and setting, being as much under the horizon as above, they were at a loss how to address themselves to them in their absence. To remedy this, they had recourse to the invention of images, in which, after their consecration, they thought these inferior deities to be as much present by their influence as in the stars themselves, and therefore that all addresses were made as effectually before the one as before the other. Several of these idols were no other than large rude stones, the worship of which, according to Al Jannabius, was introduced by the posterity of Ishmael. Since the days of Mahomet, the only religion tolerated in the Arabian peninsula is what was invented by that impostor; for an account of which see the article MAHOMETANISM.

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Commerce.

Before the Portuguese interrupted the navigation of the Red Sea, the Arabs were the factors of all the trade that passed thro' that channel. Aden, which is situated at the most southern extremity of Arabia upon the Indian ocean, was the mart in these parts. The situation of its harbour, which opened an easy communication with Egypt, Ethiopia, India, and Persia, had rendered it, for many ages, one of the most flourishing factories in Asia. Fifteen years after it had repulsed the great Albuquerque, who attempted to demolish it in 1513, it submitted to the Turks, who did not long remain masters of it. The king of Yaman, who possessed the only district in Arabia that merits the title of happy, drove them from thence, and removed the trade to Mocha, a place in his dominions which till then was only a village.

This trade was at first inconsiderable; consisting principally in myrrh, incense, aloes, balm of Mecca, some aromatics, and medicinal drugs. These articles, the exportation of which is continually retarded by exorbitant imposts, and does not exceed at present 30,625 l. were at that time more in repute than they have been since: but must have been always of little consequence. Soon after, a great change ensued from the introduction of coffee.

Though this article is generally used in the Arabian entertainments, none but the rich citizens have the pleasure of tasting the berry itself. The generality are obliged to content themselves with the shell and the husk of this valuable production. These remains, so much despised, make a liquor of a pretty clear colour, which has a taste of coffee without its bitterness and strength. These articles may be had at a low price at Betelagu, which is the general market for them. Here likewise is sold all the coffee which comes out of the country by land. The rest is carried to Mocha, which is 35 leagues distant, or to the nearer ports of Lohia or Hodeida, from whence it is transported in small vessels to Jodda. The Egyptians fetch it from the last mentioned place, and all other nations from the former.

The quantity of coffee exported may be estimated at twelve millions five hundred and fifty thousand weight. The European companies take off a million and a half; the Persians three millions and a half; the fleet from Suez six millions and a half; Indostan, the Maldives, and the Arabian colonies on the coast of Africa, fifty thousand; and the caravans a million.

As the coffee which is bought up by the caravans

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and the Europeans, is the best that can be procured, it costs about 8½ d. a pound. The Persians, who content themselves with that of an inferior quality, pay no more than about 6½ d. a pound. The Egyptians purchase it at the rate of about 8 d; their cargoes being composed partly of good, and partly of bad coffee. If we estimate coffee at about 7½ d. a pound, which is the mean price, the profits accruing to Arabia from its annual exportation will amount to 384,343 l. 15 s. This money does not go into their coffers; but it enables them to purchase the commodities brought from the foreign markets to their ports of Jodda and Mocha.

Mocha receives from Abyssinia, sheep, elephants teeth, musk, and slaves. It is supplied from the eastern coast of Africa with gold, slaves, amber, and ivory; from the Persian gulf, with dates, tobacco, and corn; from Surat, with a vast quantity of coarse, and a few fine, linens; from Bombay and Pondicherry, with iron, lead, copper, which are carried thither from Europe; from Malabar, with rice, ginger, pepper, Indian saffron, with coire, cardamom, and also with planks; from the Maldives, with gum, benzoin, aloeswood, and pepper, which these islands take in exchange; from Coromandel, with 400 or 500 bales of cottons, chiefly blue. The greatest part of these commodities, which may fetch 262,500 l. are consumed in the interior part of the country. The rest, particularly the cottons, are disposed of in Abyssinia, Socotora, and the eastern coast of Africa.

None of the branches of business which are managed at Mocha, as well as throughout all the country of Yaman, or even at Sanaa the capital, are in the hands of the natives. The extortions with which they are perpetually threatened by the government, deter them from interfering in them. All the warehouses are occupied by the Banians of Surat or Guzarat, who make a point of returning to their own country as soon as they have made their fortunes. They then resign their settlements to merchants of their own nation, who retire in their turn, and are succeeded by others.

The European companies, who enjoy the exclusive privilege of trading beyond the Cape of Good Hope, formerly maintained agents at Mocha. Notwithstanding it was stipulated by a solemn capitulation, that the imports demanded should be rated at two and a quarter *per cent.* they were subject to frequent extortions: the governor of the place insisting on their making him presents, which enabled him to purchase the favour of the courtiers, or even of the prince himself. However, the profits they obtained by the sale of European goods, particularly clothes, made them submit to these repeated humiliations. When these several articles were furnished by Grand Cairo, it was then impossible to withstand the competition, and the fixed settlements were therefore given up.

The trade was carried on by ships that failed from Europe with iron, lead, copper, and silver, sufficient to pay for the coffee they intended to buy. The supercargoes, who had the care of these transactions, settled the accounts every time they returned. These voyages, which at first were pretty numerous and advantageous, have been successively laid aside. The plantations of coffee, made by the European nations in their colonies, have equally lessened the consumption and the price of that which comes from Arabia. In process of time,

these voyages did not yield a sufficient profit to answer the high charges of undertaking them on purpose. The companies of England and France then resolved, one of them to send ships from Bombay, and the other from Pondicherry, to Mocha, with the merchandise of Europe and India. They even frequently had recourse to a method that was less expensive. The English and French visit the Red Sea every year. They dispose of their merchandise there to good advantage, they can never take in cargoes from thence for their return. They carry, for a moderate freight, the coffee belonging to the companies who lade the vessels with it, which they dispatch from Malabar and Coromandel to Europe. The Dutch company, who prohibit their servants from sitting out ships, and who send no vessels themselves, to the gulph of Arabia, are deprived of the share they might take in this branch of commerce. They have also given up a much more lucrative branch, that of Jodda.

Jodda is a port situated near the middle of the gulph of Arabia, 20 leagues from Mecca. The government there is of a mixed kind: the grand Signior and the Xerif of Mecca share the authority and the revenue of the customs between them. These imposts are levied upon the Europeans at the rate of 8 *per cent.* and upon other nations at 13. They are always paid in merchandise, which the managers oblige the merchants of the country to buy at a very dear rate. The Turks, who have been driven from Aden, Mocha, and every part of the Yaman, would long ago have been expelled from Jodda, if there had not been room to apprehend that they might revenge themselves in such a manner as to put an end to their pilgrimages and commerce.

The coins, which are current at Mocha, the principal port of the Red Sea, are dollars of all kinds; but they abate five *per cent.* on the pillar dollars, because they are reckoned not to be the purest silver, and the dollar weight with them is 17 drachms 14 grains. All their coins are taken by weight, and valued according to their pureness. The gold coins current here are ducats of Venice, Germany, Turkey, Egypt, &c. The comasses are a small coin, which are taken at such a price as the government sets on them; and they keep their accounts in an imaginary coin, called *cabeers*, of which 80 go to a dollar. For an account of the ancient coins called *dinars* and *dirhems*, see these two articles.

Gum ARABIC. See *GUM*.

ARABICI, a kind of heretics, who sprung up in Arabia, about the year 207; whose distinguishing tenet was, that the soul died with the body, and also rose again with it.

ARABIS, BASTARD TOWER-MUSTARD; a genus of the filiquosa order, belonging to the tetradynamia class of plants.

Species, &c. Of this genus there are nine different species enumerated by Linnaeus. None of them are at all remarkable for their beauty or other properties. Only one of these, the thaliana or moule-ear, is a native of Britain. It is a low plant, seldom rising more than four or five inches high, branching on every side, having small white flowers growing alternately, which have each four petals in form of a cross, that are succeeded by long slender pods filled with small round seeds. It grows naturally on sandy ground, or old walls.

Sheep

Arabia
||
Arabia

194
Coins.

Sheep are not fond of it, and swine refuse it. The other species are, the alpina, grandiflora, bellidifolia, lyrata, halleri, Canadensis, pendula, and turrita; they are not at all superior to the thaliana abovementioned, are all very hardy, and require no other culture than to be kept clear of weeds.

ARABLE LANDS, those which are fit for tillage, or which have been formerly tilled.

ARACAN, the capital of a small kingdom to the north-east of the bay of Bengal, situated in E. Long. 93. 0. N. Lat. 20. 30. It has the convenience of a spacious river, and a harbour large enough to hold all the ships in Europe. It is said by Schouten to be as large as Amsterdam; but the houses are slight, being made with palm-trees and bamboo-canes, and covered with leaves of trees. They are seldom above six feet high, but have many windows or air-holes. But the people of the highest rank are much better accommodated. They have no kitchens, chimneys, or cellars, which oblige the women to dress the victuals out of doors. Some of the streets are on the ridges of rocks, wherein are a great many shops. Their orchards and gardens contain all the fruit common to the Indies, and their trees are green all the year. Their common drink is toddy; which is the sap of the cocoa-tree, and when new will intoxicate like wine, but soon grows sour. Elephants and buffaloes are very numerous here, and are made use of instead of horses. They have plenty of provisions, and but little trade: for when Mr Charnock was here in 1686, with six large ships, there was nothing to be had in the way of commerce; and yet the country produces lead, tin, stick-lac, and elephants teeth. The Mogul's subjects come here to purchase these commodities; and sometimes meet with diamonds, rubies, and other precious stones. They were formerly governed by a king of their own, called the king of the *White Elephant*; but this country has been conquered by the king of Pegu. They pay little or no regard to the chastity of their women, and the common faults take great liberties among them. Their religion is Paganism; and the idols, temples, and priests are very numerous. The dress of the better sort is very slight, for it consists chiefly of a piece of white cotton over their arms, breast, and belly, with an apron before. The complexion of the women is tolerable; they wear thin flowered gauze over their breast and shoulders, and a piece of cotton, which they roll three or four times round their waist, and let it hang as low as their feet. They curl their hair, and put glass rings in their ears, and stretch them of a monstrous length. On their arms and legs they have hoops of copper, ivory, silver, &c. The country produces great quantities of rice, and the water is good. Their flocks of sheep and herds of cattle are also numerous near Aracan; but what they say of the towns and villages, with which the country is pretended to be overspread, may be doubted. Captain Hamilton affirms, that there are but few places inhabited, on account of the great number of wild elephants and buffaloes, which would destroy the fruits of the ground; and that the tigers would destroy the tame animals. There are some islands near the sea, inhabited by a few miserable fishermen, who can just keep themselves from starving, tho' they are out of the reach of oppression. The rich burn the dead bodies; but the poor, who are

not able to buy wood, throw them into the river.

ARACHIS, in botany, a genus of the diadelphia decandria class. There is only one species, viz. the hypogæa, a native of America. The calix is divided into two parts; and the capsule or pod is cylindrical, and contains two seeds.

ARACHNE, in fabulous history, a young maid of Lydia, said to have been the inventress of spinning. She is fabled to have been so skilful in this art, as to challenge Minerva at it; who tore her work, and struck her; which disgrace driving her to despair, she hanged herself. Pallas, from compassion, brought her to life, and transformed her into a spider, which still employs itself in spinning.

ARACHNOÏDES, in anatomy, an appellation given to several membranes; as the tunic of the crystalline humour of the eye, the external lamina of the pia mater, and one of the coverings of the spinal marrow.

ARACK, ARRACK, or RACK, a spirituous liquor imported from the East Indies, used by way of dram and in punch. The word *arack* is an Indian name for strong waters of all kinds; for they call our spirits and brandy *English arack*. But what we understand by the name *arack*, is really no other than a spirit procured by distillation from a vegetable juice called toddy, which flows by incision out of the cocoa-nut tree, like the birch juice procured among us.

The toddy is a pleasant drink by itself, when new, and purges those who are not used to it; and, when stale, it is heady, and makes good vinegar. The English at Madras use it as leaven to raise their bread with.

Goa and Batavia are the chief places for arack. At Goa there are different kinds; single, double, and treble distilled. The double distilled, which is that commonly sent abroad, is but a weak spirit in comparison to Batavia arack: yet, on account of its peculiar and agreeable flavour, it is preferred to all other aracks of India. This is attributed to the earthen vessels, which alone they use at Goa to draw the spirit; whereas at Batavia they use copper stills. The Parier arack made at Madras, and the Colombo and Quilone arack at other places, being fiery hot spirits, are but little valued by the Europeans, and therefore seldom imported, though highly prized among the natives.

ARÆ PHILÆNON, or PHILÆNORUM, (Strabo); to the south of the Syrtis Major; but in Ptolemy, more westerly, to the south almost of the Syrtis Minor. In Strabo's time, the altars were not extant, but a village of the same name stood on the spot. On a dispute about limits, between the Cyreneans and Carthaginians, it was agreed that two of each people should set out on the same day, and that where they should happen to meet, there the limits of both should be fixed. The Philæni, two brothers, Carthaginians, undertook it for Carthage; these, after having advanced a great many miles into the territory of the Cyreneans, were met by their antagonists; who, enraged at their being before-hand with them so far, gave them the option of either returning back, or of being buried alive on the spot: like zealous patriots, they chose the latter; and there the Carthaginians raised two altars in honour of the Philæni. (Sallust, Valerius Maximus).

ARÆOMETER, an instrument to measure the gravity

Aræostyle
|
Aragon.

Aral
|
Aranea.

Aræostyle, a vessel, which is usually made of a thin glass ball, with a taper neck, sealed at the top, there being first as much mercury put into it as will keep it swimming in an exact posture. The neck is divided into two parts, which are numbered, that so, by the depths of its descent into any liquor, its lightness may be known by these divisions.

ARÆOSTYLE, in architecture, a term used by Vitruvius, to signify the greatest interval which can be made between columns.

ARÆOTICS, in medicine, remedies which rarify the humours, and render them easy to be carried off by the pores of the skin.

ARAF, among the Mahometans. See ALARAF.

ARAFAH, the ninth day of the last month of the Arabic year, named *Dhouhagiat*; on which the pilgrims of Mecca perform their devotions on a neighbouring mountain, called *Arafat*. The Mahometans have a very great veneration for this mountain, because they believe that Adam and Eve, after they were banished out of Paradise, having been separated from each other during 120 years, met afterwards on this mountain.

ARAFAT, or GIBEL EL ORPHAT, the mountain of knowledge, a mountain in Arabia, near Mecca. The Mahometans say this was the place where Adam first met with and knew his wife Eve after their expulsion from Paradise. This mountain not being large enough to contain all the devotees that come annually in pilgrimage to Mecca, stones are set up all round it to show how far it reaches. The pilgrims are clad in robes of humility and mortification, with their heads uncovered. They seem to be very much affected; for the tears flow down their cheeks, and they sob and sigh most bitterly, begging earnestly for remission of sins, and promising to lead a new life. They continue here about four or five hours, and at half an hour after sun-set they all decamp to perform a religious duty called *Asbam nomas*. After this, they all receive the honourable title of Hadgees, which is conferred upon them by the imam or priest. This being pronounced, the trumpet sounds, and they all return to Mecca.

ARAGON, a province of Spain, bounded on the north by the Pyrenean mountains, which separate it from France; on the west, by Navarre and the two Castiles; on the south, by Valencia; and on the east, by Catalonia. It is in length about 180 miles, and in breadth 149; but the land is mountainous, dry, sandy or stony, badly cultivated, and worse peopled. However, it does not want rivers; for besides the Ebro, which crosses it in the middle, there are the Xalo, the Cineca, the Galego, and the Aragon. The air is pure and wholesome; and there are mines of iron, and some say of gold. The most fertile parts are about the rivers: for there the land produces corn, wine, oil, flax, hemp, various fruits, and a small quantity of saffron, besides large flocks of sheep, and plenty of game in the woods.

The Aragonese are bold, courageous, and well-bred; but positive in their opinions, and bigotted in their religion. These were the first of the Spaniards that threw off the Moorish yoke. Saragossa is the capital of this province; and the other chief towns are Balbastro, Jaca, Sarazona, Haefca, Calatajud, Albarazin, Trevel, Daroca, and Boria.

ARAL, a great lake, in the kingdom of Khowarazm, lying a little to the eastward of the Caspian sea. Its length from north to south is said to be near 150 miles, and its breadth from east to west about 70. The shore on the west side is high and rocky, and destitute of good water: yet there are abundance of wild horses, asses, antelopes, and wolves; as also a fierce creature called a *jolhart*, which the Tartars say is of such a prodigious strength as to carry off a horse. It is surprising that this lake should be quite unknown to geographers, till within these few years. Several great rivers, which were supposed to run into the Caspian sea, are now known to fall into this lake, particularly the Sihnn or Sirr, and the Gihun or Amo, so often mentioned by the Oriental historians. This lake, like the Caspian sea, has no visible outlet. Its water is also very salt; and for that reason is conveyed by the neighbouring inhabitants by small narrow canals into sandy pits, where the heat of the sun, by exhaling the water, leaves them a sufficient quantity of salt. The same kinds of fish are found in Aral that are found in the Caspian sea. The former is also called the *Lake of Eagles*.

ARALIA, BERRY-BEARING ANGELICA, a genus of the pentagynia order, belonging to the pentandria class of plants.

Species. Of this genus some authors enumerate five species; but none of them merit description, except one called *nudicaulis*, having a naked stalk. This grows three or four feet high; the leaves have two large trifoliate lobes, which are sawed on their edges. The flower-stalks arise between these, immediately from the root, and are terminated by round umbels of small four-leaved flowers of a whitish colour. What is remarkable of this species is, that its roots were brought over from North America where it grows, and sold here for *sarsaparilla*, and it is still used as such by the inhabitants of Canada; though it is very different from the true fort. All the species of this plant are hardy, except one called the *spinosa*, which requires an hot-bed; but is destitute of the little beauty possessed by the others, so is very seldom cultivated except in botanic gardens for variety.

ARAMONT, a town of Languedoc, in France, seated on the river Rhone. E. Long. 4. 52. N. Lat. 43. 54.

ARANEAE, the SPIDERS, a genus of insects belonging to the order of aptera, or insects without wings. All the species of spiders have eight legs, with three joints in each, and terminating in three crooked claws; eight eyes, two before, two behind, and the rest on the sides of the head. The mouth consists of two claws or talons, denticulated like a saw. A little below the point of the claw, there is a small hole, through which the spider emits a kind of poison. These claws are the weapons with which they kill flies, &c. for their food. The belly or hinder part is separated from the head and breast by a small thread-like tube. The skin or outer surface is a hard polished crust. Spiders have five tubercles or nipples at the extremity of the belly, whose apertures they can enlarge or contract at pleasure. It is through these apertures that they spin a gluey substance with which their bellies are full. They fix the end of their threads by applying these nipples to any substance, and the thread lengthens in proportion as the

Aranea,
or spider.

the animal recedes from it. They can stop the issuing of the threads by contracting the nipples, and re-ascend by means of the claws on their feet, much in the same manner as some men warp up a rope. When the common house-spider begins her web, she generally chooses a place where there is a cavity, such as the corner of a room, that she may have a free passage on each side, to make her escape in case of danger. Then she fixes one end of her thread to the wall, and passes on to the other side, dragging the thread along with her (or rather the thread follows her as she proceeds), till she arrives at the other side, and there fixes the other end of it. Thus she passes and repasses, till she has made as many parallel threads as she thinks necessary for her purpose. After this, she begins again and crosses these by other parallel threads, which may be named the *woof*. These are the toils or snares which she prepares for entangling flies, and other small insects, which happen to light upon it. But, besides this large web, she generally weaves a small cell for herself, where she lies concealed watching for her prey. Betwixt this cell and the large web she has a bridge of threads, which, by communicating with the threads of the large one, both give her early intelligence when any thing touches the web, and enables her to pass quickly in order to lay hold of it. There are many other methods of weaving peculiar to different species of spiders. But, as they are all intended for the same purpose, it is needless to give particular descriptions of them.

Linnaeus enumerates 47 species of spiders: But it will be sufficient here to mention only the most remarkable and uncommon; as,

1. The calycina, with a round pale yellow belly, and two hollow points. It lives in the cups of flowers, after the flower-leaves have fallen off; and catches bees, and other flies, when they are in search of honey.

2. The avicularia, has a convex round breast, hollowed transversely in the middle. It is a native of America, and feeds upon small birds, insects, &c. The bite of this spider is as venomous as that of the serpent.

3. The ocellata, has three pair of eyes on its thighs. It is about the same size with the tarantula, of a pale colour, with a black ring round the belly, and two large black spots on the sides of the breast. It is a native of China.

4. The faccata, has an oval belly of a dusky iron colour. It lives in the ground, and carries a sack with its eggs wherever it goes. This sack it glues to its belly, and will rather die than leave it behind.

5. The aquatica, is of a livid colour, with an oval belly, and a transverse line, and two hollowed points. It frequents the fresh waters of Europe. But it is in some sort amphibious: for it can live on the earth as well as in the water, and comes often to land for its food; yet it swims well in water, both on its belly and back: it is distinguishable by its brightness. In the water its belly appears covered with a silver varnish, which is only a bubble of air attached to its belly by means of the oily humours which transpire from its body, and prevent the immediate contact of the water. This bubble of air is made the substance of its dwelling, which it constructs under water: for it fixes several threads of silk, or such fine matter, to the stalks of plants in the water; and then ascending to the surface, thrusts the hinder part of its body above water, draw-

Aranea.
or spider.

ing it back again with such rapidity, that it attaches underneath a bubble of air, which it has the art of detaching under water, by placing it underneath the threads above mentioned, and which it binds like a covering almost all round the air-bubble. Then it ascends again for another air-bubble; and thus proceeds until it has constructed a large aerial apartment under water, which it enters into or quits at pleasure. The male constructs for himself one near to the female; and when love invites, he breaks through the thread walls of the female's dwelling, and the two bubbles attached to the bellies of both unite into one, forming one large nuptial chamber. The female is sometimes laid for a whole day together stretched on her back, waiting for the arrival of the male, without motion, and seemingly as if dead. As soon as he enters and glides over her, she seems to be brought to life again, gets on her legs and runs after the male, who makes his escape with all possible speed: the female takes care of the young, and constructs similar apartments on purpose for them. The figure of this spider has nothing remarkable, and would be overlooked among a crowd of curiosities, if the spectator be unacquainted with its singular art of constructing an aerial habitation under water, and thus uniting together the properties of both elements.

6. The tarantula, Plate XXV. fig. 10. The breast (1) and belly (2) are of an ash-colour; the legs (3) are likewise ash-coloured, with blackish rings on the under part; the fangs, or nippers (4), are red on the inner side, the rest being blackish; (5) is the antennæ or feelers: Two of its eyes are larger than the other, red, and placed in the front; four other eyes are placed in a transverse direction towards the mouth; the other two are nearer the back. It is a native of Italy, Cyprus, Barbary, and the East Indies. The breast and belly are about two inches long, terminated by two short tails. This figure was taken from the life, in the island of Cyprus, by Alex^d Drummond, Esq; late consul at Aleppo.

The bite of the tarantula is said to occasion an inflammation in the part, which in a few hours brings on sickness, difficulty of breathing, and universal faintness. The person afterwards is affected with a delirium, and sometimes is seized with a deep melancholy. The same symptoms return annually, in some cases, for several years; and at last terminate in death. Music, it has been pretended, is the only cure. A musician is brought, who tries a variety of airs, till at last he hits upon one that urges him to dance; the violence of which exercise produces a proportionable agitation of the vital spirits, attended with a consequent degree of perspiration, the certain consequence of which is a cure. Such are the circumstances that have been generally related, and long credited, concerning the bite of this animal. Kircherus, in his *Musurgia*, gives a very particular account of the symptoms and cure, illustrated by histories of cases. Among these, he mentions a girl, who, being bitten by this insect, could be cured only by the music of a drum. He then proceeds to relate that a certain Spaniard, trusting to the efficacy of music in the cure of the frenzy occasioned by the bite of the tarantula, submitted to be bitten on the hand by two of these creatures, of different colours, and possessed of different qualities. The venom was no sooner diffused about his body, than the symptoms of the

diforder

Aranea,
or spider.

The
Tarantula.

Aranea,
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The
Tarantula.

disorder began to appear; upon which harpers, pipers, and other musicians, were sent for, who by various kinds of music endeavoured to rouse him from that stupor into which he was fallen: but here it was observed that the bites of the two insects had produced contrary effects; for by one he was incited to dance, and by the other he was restrained therefrom; and in this conflict of nature the patient expired. The same account is given in his *Phonurgia Nova*, with the addition of a cut representing the insect in two positions, the patient in the action of dancing, together with the musical notes of the tune or air by which in one instance the cure was effected.

In his *Mysurgia*, this author, attempting mechanically to account for the cure of the bite of the tarantula by music, says of the poison, That it is sharp, gnawing, and bilious; and that it is received and incorporated into the medullary substance of the fibres. With respect to the music, he says, That the sounds of chords have a power to rarify the air to a certain harmonical pitch; and that the air thus rarified, penetrating the pores of the patient's body, affects the muscles, arteries, and minute fibres, and incites him to dance, which exercise begets a perspiration, in which the poison evaporates.

Unsatisfactory as this theory appears, the belief of this strange phenomenon has prevailed among the ablest of modern physicians. Sir Thomas Brown, so far from disputing it, says, That since many attest the fact from experience, and that the learned Kircherus hath positively averred it, and set down the songs and tunes solemnly used for the cure of the disease, and since some also affirm that the tarantula itself will dance at the sound of music, he shall not at all question it*.

Farther, that eminent Italian physician of the last century, Baglivi, a native of Apulia, the country where the tarantula is produced, has written a dissertation *De anatomia, morbis, et effectibus tarantulae*. In this he describes the region of Apulia where the tarantula is produced, with the anatomy and figure of the insect and its eggs, illustrated by an engraving; he mentions particularly the symptoms that follow from the bite, and the cure of the disease by music, with a variety of histories of cures thus wrought, many of them communicated by persons who were eye-witnesses of the process.

Ludovicus Valetta, a Celestine monk of Apulia, published at Naples, in the year 1706, a treatise upon this spider, in which he not only answers the objections of those who deny the whole thing, but gives, from his own knowledge, several instances of persons who had suffered this way, some of whom were of great families, and so far from being dissemblers, that they would at any rate, to avoid shame, have concealed the misfortune which had befallen them.

The honourable Mr Robert Boyle, in his treatise of Languid and Unheeded Motions, speaking of the bite of the tarantula, and the cure of the disease which follows it by means of music, says, That, having himself had some doubts about the matter, he was, after strict inquiry, convinced that the relations in the main were true.

Lastly, Dr Mead, in his Mechanical Account of Poisons, has given an essay on the tarantula, containing the substance of the above relations, which he endeavours to confirm by his own reasoning thereon.

Notwithstanding the number and weight of these authorities, and the general acquiescence of learned and ingenious men in the opinion that the bite of the tarantula is poisonous, and that the cure of the disorder occasioned by it is effected by music, we have reason to apprehend that the whole is a mistake.

In the Philosophical Transactions for the year 1672, p. 406. is an extract of a letter from Dr Thomas Cornelio, a Neapolitan physician, to John Doddington, Esq; his majesty's resident at Venice, communicated by the latter, in which, speaking of his intention to send to Mr Doddington some tarantulas, he says, "Mean while I shall not omit to impart to you what was related to me a few days since by a judicious and unprejudicate person; which is, that being in the country of Otranto, where those insects are in great numbers, there was a man who, thinking himself stung by a tarantula, shewed in his neck a small speck, about which in a very short time there arose some pimples full of a ferous humour; and that, in a few hours after, the poor man was sorely afflicted with very violent symptoms, as syncope, very great agitations, giddiness of the head, and vomiting; but that, without any inclination at all to dance, and without all desire of having any musical instruments, he miserably died within two days. The same person affirmed to me, that all those that think themselves bitten by tarantulas, except such as for evil ends feign themselves to be so, are for the most part young wanton girls, whom the Italian writers call *Dolce di Sale*; who, by some particular indisposition falling into this melancholy madness, persuade themselves, according to the vulgar prejudice, to have been stung by a tarantula."

Dr Serao, an Italian physician, as it seems, has written an ingenious book, in which he has effectually exploded this opinion as a popular error; and in the Philosophical Transactions, N^o LX. for the year 1770, p. 236. is a letter from Dominico Cirillo, M. D. professor of natural history in the university of Naples, wherein, taking notice of Serao's book, he says, That, having had an opportunity of examining the effects of this animal in the province of Taranto, where it is found in great abundance, he finds that the surprising cure of the bite of the tarantula by music has not the least truth in it; and that it is only an invention of the people, who want to get a little money by dancing when they say the tarantism begins. He adds, "I make no doubt but sometimes the heat of the climate contributes very much to warm their imaginations, and throw them into a delirium, which may be in some measure cured by music; but several experiments have been tried with the tarantula, and neither men nor animals after the bite have had any other complaint than a very trifling inflammation upon the part, like that produced by the bite of a scorpion, which goes off by itself without any danger at all. In Sicily, where the summer is still warmer than in any part of the kingdom of Naples, the tarantula is never dangerous; and music is never employed for the cure of the pretended tarantism."

ARANJUEZ, a palace of the king of Spain, in the province of New Castile, seated on the river Tago, in W. Long. 3. 3. N. Lat. 41. 40. This edifice tho' much inferior to the scurlar in size and elegance of structure, greatly exceeds it in the many delicious gardens,

* Inquiries
into Vulgar
Errors,
book III.
chap. 28.

Arar,
Ararat.

gardens, and surprising water-works, which are here in the highest perfection. The gardens, being in an island in the middle of the Tagus, are so well supplied with water by the immense quantity and variety of these water-works, which are set in motion with the stream, that they are never scorched with the sun's heat, but enjoy a constant bloom and delicious verdure.

ARAR, (Cæsar, Strabo); *Araris*, (Dio Cassius); *Saucona*, (Ammian); a river of Celtic Gaul, now the *Saône*; which rises out of mount Vogesus on the confines of Lorraine, runs through the Franche Comté and Burgundy, and below Lyons falls into the Rhone. It is so incredibly slow, that the eye cannot distinguish which way it moves, (Cæsar); and therefore Pliny calls it the *Sluggish river*. Its course is from north to south. It is famous for a bridge of Cæsar, which was built by the soldiers in one day. It is navigable equally with the Rhone.

ARARAT, the name of the mountain on which Noah's ark rested, after the abatement of the waters of the universal deluge. Concerning this mountain there are various conjectures; though it is almost universally allowed to be in Armenia Major. Some are of opinion that it is one of the mountains which divide Armenia on the south from Mesopotamia and that part of Assyria inhabited by the *Curds*; from whom these mountains took the name of *Curdu* or *Cardu*, by the Greeks turned into *Gordyæ*, &c. Others, that it lies towards the middle of Armenia, near the river Araxes, above 280 miles distant from the abovementioned mountains, making it belong to mount Taurus; but the Armenians are positive that Noah's Ararat is no other than a mountain to which they now give the name of *Masis*, which lies about 12 leagues to the east of Erivan, and four leagues from the Aras. It is encompassed by several petty hills: on the tops of them are found many ruins, thought to have been the buildings of the first men, who were, for some time, afraid to descend into the plains. It stands by itself, in form of a sugar-loaf, in the midst of a very large plain, detached, as it were, from the other mountains of Armenia, which make a long chain. It consists, properly speaking, of two hills; the lesser of which is the more sharp and pointed; the higher, on which it is said the ark rested, lies to the north-west of it, and rises far above the neighbouring mountains. It seems so high and big, that, when the air is clear, it may be seen four or five days journey off; yet travellers think the height is not extraordinary. Chardin is of opinion that he passed a part of mount Caucasus which is higher; and Poulet thinks the height of mount Masis, or Ararat, not above twice as great as that of mount Valerian near Paris. They therefore think that its being visible at such a great distance is owing to its lonely situation in a vast plain, and upon the most elevated part of the country, without any mountains before it to obstruct the view. Nor is the snow with which it is always covered from the middle upwards any argument of its height; for, in this country, ice hath often been observed in the mornings of the middle of July *. Certain it is, however, that this mountain hath never yet been ascended; which the Armenians pretend was owing to the interposition of angels, in order to disappoint the curiosity of those who wanted to advance to such a sacred place as that

Ararat
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Aratus.

where the ark rested: but the excess of cold may very reasonably be supposed able to frustrate all such attempts, without any supernatural interposition. The most distinct account we have of this mountain is that given by Mr Tournefort; which, however, being much swelled with immaterial circumstances, it is needless to trouble our readers with at length. He tells us, that this mountain is one of the most disagreeable sights upon earth, without either houses, convents, trees, or shrubs; and seems as if continually wasting and mouldering away. He divides it into three regions: The lowermost, he says, is the only one which contains any human creatures, and is occupied by a few miserable shepherds that tend scabby flocks; and here are also found some partridges: the second is inhabited by crows and tigers; and all the rest is covered with snow, which half the year is involved in thick clouds. On the side of the mountain that looks towards Erivan, is a prodigious precipice, from whence rocks of an immense size are continually tumbling down with a hideous noise. This precipice seems quite perpendicular; and the extremities are rough and blackish, as if smutted with smoke. The soil of the mountain is loose, and on the sandy parts it is impossible to take a firm step; so that our traveller encountered great difficulties in his ascent and descent of this mountain; being often obliged, in order to avoid the sand, to betake himself to places where great rocks were heaped on one another, under which he passed as through caverns, or to places full of stones, where he was forced to leap from one stone to another. If we may believe Struys, a Dutch writer, however, all these difficulties may be surmounted. He assures us, he went five days journey up mount Ararat, to see a Romish hermit: that he passed through three regions of clouds; the first dark and thick, the next cold and full of snow, and the third colder still; that he advanced five miles every day; and when he came to the place where the hermit had his cell, he breathed a very serene and temperate air: that the hermit told him, he had perceived neither wind nor rain all the 25 years he had dwelt there; and that on the top of the mountain there still reigned a greater tranquillity, whereby the ark was preserved uncorrupted. He farther pretends, that the hermit gave him a cross made out of the wood of the ark, together with a certificate, a formal copy of which the author has given in his sham relation.

ARASSI, a maritime, populous, and trading town of Italy, in the territory of Genoa. E. Long. 7. 20. N. Lat. 44. 3.

ARATUS, general of the Achæans, conquered Nicæus tyrant of Sicyon. Two years after, he surprised the castle called *Acrocorinthus*, and drove out the king of Macedonia: he delivered Argos from its tyrants, and was poisoned by Philip II. king of Macedonia, whom he had newly restored: he was about 62 when he died, the second year of the 141st Olymp. He was interred at Sicyon, and received the greatest honours from his countrymen. His son, who had also been prætor, was poisoned by king Philip. Polybius gives us so great a character of Aratus the father's Commentaries or History, that the loss of so valuable a work is highly to be regretted.

ARATUS, a Greek poet, born at Soli, or Solæ, a town in Cilicia, which afterwards changed its name,

Aratus
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Arav.

and was called *Pompeopolis*, in honour of Pompey the Great. He flourished about the 124th, or, according to some, the 126th Olympiad, in the reign of Ptolemy Philadelphus king of Egypt. He discovered in his youth a remarkable poignancy of wit, and capacity for improvement; and having received his education under Dionysius Heracleotes, a Stoic philosopher, he espoused the principles of that sect. Aratus was physician to Antigonus Gonatus, the son of Demetrius Poliorcetes, king of Macedonia; this prince, being a great encourager of learned men, sent for him to court, admitted him to his intimacy, and encouraged him in his studies. The *Phænomena* of Aratus, which is still extant, gives him a title to the character of an astronomer, as well as a poet; in this piece he describes the nature and motion of the stars, and shews the particular influences of the heavenly bodies, with their various dispositions and relations. He wrote this poem in Greek verse; it was translated into Latin by Cicero; who tells us, in his first book *De oratore*, that the verses of Aratus are very noble. This piece was translated by others as well as Cicero; there being a translation by Germanicus Cæsar, and another into elegant verse by Festus Avienus. An edition of the *Phænomena* was published by Grotius, at Leyden, in quarto, 1600, in Greek and Latin, with the fragments of Cicero's version, and the translations of Germanicus and Avienus, all which the editor has illustrated with curious notes. He was certainly much esteemed by the ancients, since we find so great a number of scholiasts and commentators upon him. There are several other works also ascribed to Aratus. Suidas mentions the following: Hymns to Pan; Astrology and Astrotheſy; a compilation of Antidotes; an *Ἐπιθόκη* on Theopropus; an *Ἱστορία* on Antigonus; an Epigram on Phila, the daughter of Antipater, and wife of Antigonus; an Epicedium of Cleombrotus; a Correction of the Odyssey; and some Epistles, in prose. Virgil, in his *Georgics*, has imitated or translated many passages from this author; and St Paul has quoted a passage of Aratus. It is in his speech to the Athenians (*Acts* xvii. 28.) wherein he tells them, that some of their own poets have said, "Τὸ πᾶν καὶ τὸν θεὸν ἵκεται: For we are also his offspring." These words are the beginning of the fifth line of the *Phænomena* of Aratus.

ARAVA, a fortress of Upper Hungary, in a county and on a river of the same name. *E. Long.* 20. 0. *N. Lat.* 49. 20.

ARAUO, a fortress and town of Chili, in South America; situated in a fine valley, on a river of the same name. The natives are so brave, that they drove the Spaniards out of their country, though they had no fire-arms. *W. Long.* 51. 20. *S. Lat.* 42. 30.

ARASIO, or *Civitas Arausensis*, or *Arausicorum*, (*Notitiæ*); *Colonia Secundanorum*, (*Mela*, *Pliny*, *Coins*), so called because the veterans of the second legion were there settled: The capital of the Cavarea, in Gallia Narbonensis; now *Orange*, in the west of Provence, on an arm of the rivulet Egue, which soon after falls into the Rhone, from which it is distant a league to the east, at the foot of a mountain. Here is an ancient amphitheatre to be still seen. *E. Long.* 4. 46. *Lat.* 44. 10.

ARAW, a town of Switzerland, in Argow, seated on the river Aar. It is handsome, large, and remark-

ble for its church, its fountain, and the fertility of the soil. *E. Long.* 18. 0. *N. Lat.* 47. 25.

ARAXES, now the *ARAS*, a river of Armenia Major, which takes its rise in a mountain called *Albor*, where the Euphrates also hath its origin. From this mountain it runs eastward with a serpentine course, discharging itself into the Caspian sea, after a run of upwards of 500 miles, during which it receives some considerable rivers. Some have imagined that it hath its rise in mount Ararat; but Tournefort assures us that it comes no nearer that mountain than 12 miles. The Araxes is a very rapid river, and is supposed to be the Gihon mentioned by Moses. Besides this extreme rapidity, it is very apt to overflow after rains; so that they have in vain endeavoured to build bridges over it; tho' some of them appear, from the few arches remaining, to have been built of the best materials, and in the strongest manner. Such is the vehemence of its current after the thawing of the adjacent snows, or some fierce rains, that neither banks nor dykes can resist it; so that nothing can be more terrible than the noise and violence of its waves at such times: but in winter, when its waters are low, it is fordable in some places on camels.

ARBACES governed Media under Sardanapalus. Seeing him spinning among a company of his women, he stirred up his people to revolt, and dethroned Sardanapalus; who thereupon burnt himself in his palace. Arbaces being crowned, began the monarchy of the Medes, which lasted 317 years under nine kings, till Astyages was expelled by Cyrus. Arbaces reigned 22 years, and died a. m. 3206.

ARBELA, now *IRBIL*, a city of Assyria, lying in *E. Long.* 44. 5. *N. Lat.* 35. 15. It is famous for the last and decisive battle fought in its neighbourhood between Alexander the Great and Darius Codomanus. This battle was fought 331 years before Christ, and the event of it determined the fate of the Persian empire. Arrian relates, that Darius's army consisted of a million of foot, and 40,000 horse; according to Diodorus, there were 200,000 horse, and 800,000 foot; Plutarch relates, that the horse and foot together made up a million; and Justin gives us exactly half Diodorus's number. The Macedonian army, according to Arrian, consisted of 40,000 foot, and 7000 horse. To prevent the endeavours of Darius to surround them, Alexander caused his front to be extended as wide as possible without weakening the centre. Darius's front was covered with 200 chariots armed with scythes, whose appearance was very terrible, and threatened destruction to the whole army; but Alexander's light-armed troops killed many of the horses and drivers, so that few reached the Macedonian line, which opening as Alexander had directed, they only passed thro', and were then either taken or disabled by his bodies of reserve. Some ancient writers describe this battle very particularly: but as the Macedonians lost only 300 men, while the Persians had 30,000 killed, according to Arrian; 40,000, according to Curtius; and 90,000, according to Diodorus; it is impossible the Persians could have made any great resistance. Indeed, as the compilers of the Universal History observe, "had the 7 or 800,000 men which Darius brought into the field thrown each one dart, or one stone, the Macedonians could never have bought the empire of the east at so

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Arbela.

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easy a rate." Darius, on seeing his numerous army so shamefully put to flight, was some time in suspense whether or not he should put an end to his life; but, being persuaded by his friends, or probably hurried away by the multitude who fled, he was obliged to fly with the rest; and arrived at Arbela the same night. After he had passed the river Lycus, he was advised to break down the bridge, in order to stop Alexander's pursuit: but, considering how many of his own subjects had yet to pass, he could not be prevailed upon to do so; answering, that he had rather leave an open way to a pursuing enemy, than shut it to a flying friend. This battle is likewise called the battle of *Gaugamela*, a village nearer the scene of action; but as Arbela is the place of greatest consequence, its name is most usually retained.

ARBERG, a town of Switzerland, in the canton of Bern, with a handsome castle, where the bailiff resides. It is seated on the river Aar, in a kind of island. E. Long. 17. 15. N. Lat. 47. 0.

ARBITER, in the civil law, implies a judge nominated by the magistrate, or chosen voluntarily by the two contending parties, in order to decide their differences.

The civilians make a difference between *arbitrator* and *arbitrator*, though both found their power on the compromise of the parties; the former being obliged to judge according to the customs of the law, whereas the latter is at liberty to use his own discretion, and accommodate the difference in the manner that appears to him most just and equitable.

ARBITRARY, that which is left to the choice or arbitration of men, or not fixed by any positive law or injunction.

ARBITRARY Punishment, in law, denotes such punishments as are by statute left to the discretion of the judge. It is a general rule in arbitrary punishments, that the judge cannot inflict death. Hence all punishments that are not capital have acquired the name of *arbitrary punishments*, even although they be expressly pointed out by statute.

ARBITRATION is where the parties, injuring and injured, submit all matters in dispute, concerning any personal chattels or personal wrong, to the judgment of two or more arbiters or arbitrators; who are to decide the controversy: and if they do not agree, it is usual to add, that another person be called in as umpire, (*imperator or impar*), to whose sole judgment it is then referred; or frequently there is only one arbitrator originally appointed. This decision, in any of these cases, is called an *award*. And thereby the question is as fully determined, and the right transferred or settled, as it could have been by the agreement of the parties or the judgment of a court of justice. See also Law, Part III. N° clxxxv. 15, &c.

ARBITRATOR, a private extraordinary judge, chosen by the mutual consent of parties, to determine controversies between them. See ARBITER and ARBITRATION.

ARBOIS, a small populous town of France, in the Franche Comte, famous for its wines. E. Long. 5. 40. N. Lat. 46. 55.

ARBON, an ancient town in Switzerland, on the south banks of the lake Constance, in Thurgau. It has a castle built by the Romans, and is under the ju-

isdiction of the bishop of Constance. In the time of war, the Swis have a right to put in a garrison. The Popish and Protellant religions are equally tolerated in this town. E. Long. 9. 30. N. Lat. 4. 38.

ARBOR, in botany, a tree. Trees are by Linnaeus classed in the seventh family of the vegetable kingdom, and are distinguished from shrubs in that their stems come up with buds on them; but this distinction holds not universally, there being rarely any buds on the large trees in India.

ARBOR, in mechanics, the principal part of a machine, which serves to sustain the rest; also the axis or spindle on which a machine turns, as the *arbor* of a crane, windmill, &c.

ARBOR Diana. See CHEMISTRY, n° 198.

ARBORESCENT, an epithet applied to such objects as resemble trees.

ARBORESCENT *Star-fish*, in zoology, a species of asterias. See ASTERIAS.

ARBORIST, a person skilled in that part of botany which treats of trees.

ARBOUR, in gardening, a kind of shady bower, formerly in great esteem; but of late rejected, on account of its being damp and unwholesome.

Arbours are generally made of lattice-work, either of wood or iron; and covered with elms, limes, hornbeams; or with creepers, as honey-suckles, jasmines, or passion-flowers; either of which will answer the purpose very well, if rightly managed.

ARBROATH. See ABERBROTHIC.

ARBURG, a town of Switzerland, in the canton of Bern, on the river Aar. It is small, but very strong, being seated on a rock, and defended by a good fortress cut out of the rock. E. Long. 17. 55. N. Lat. 47. 10.

ARBUTHNOT (Alexander), principal of the university of Aberdeen in the reign of James VI. of Scotland, was born in the year 1538. He studied first at Aberdeen; and was afterwards sent over to France, where, under the famous Cujacius, he applied himself to the study of the civil law. In the year 1563, he returned to Scotland, and took orders. Whether he was ordained by a bishop, or by presbyters, is a matter of uncertainty. In 1568, he was appointed minister of Arbuthnot and Logy-Buchan; and in the following year, Mr Alexander Anderon being deprived, our author was made principal of the king's college at Aberdeen, in his room. In the general assembly which met at Edinburgh in the years 1573 and 1577, he was chosen moderator; and to the end of his life was an active supporter of the reformed religion. He died in 1583, in the 45th year of his age; and was buried in the college church of Aberdeen. We are told in the Biographia, that he was eminent as a poet, a philosopher, a mathematician, a lawyer, a divine, and a physician. He wrote, *Orationes de origine & dignitate juris*, printed Edinb. 1572, 4^{to}. His contemporary, Thomas Maitland, wrote a copy of Latin verses on the publication of this book: they are printed in the *Delic. Poetar. Scot.* He published Buchanan's history of Scotland in the year 1582.

ARBUTHNOT (Dr John), was born in Kincardineshire, near Montrose, and was educated at Aberdeen, where he received his degree in physic. The difficulties in which his family was involved on account of their political principles making it necessary that he

Arbor
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Arbuthnot.

Arbutus,
Arbutus.

should court preferment in another country than his own, he went to London. The first character in which he acted there was, a teacher of the mathematics; and while he was employed in this manner, he had occasion to publish his *Examination of Dr Woodward's account of the deluge*. This tract, which abounded with learning and good sense, served to make him known. He published, soon after, his *Essay on the usefulness of mathematics*. In the profession of physic, he advanced by slow but sure degrees; and his reputation in it was at length fully established, by a successful cure which he performed on Prince George of Denmark. Queen Anne, in consequence of it, appointed him one of her physicians in ordinary in 1709; and, some years before this, his extensive knowledge had procured him admission into the Royal Society. His talents and worth were the strongest recommendations of him to the men of wit and learning of his day; and he entered into particular connection with Pope and Swift, with whom he joined in publishing several volumes of miscellanies; among which are the well known *Memoirs of Martinus Scriblerus*, a satire of infinite humour on the abuses of human learning. In 1715, he assisted Pope and Gay in the *Three hours after marriage*; a dramatic performance, which was brought upon the stage without success. In 1727, he published *Tables of ancient coins, weights, and measures*; a work of great use, and real erudition. In 1732, his valuable tract concerning *The nature and choice of aliments* appeared; which, the year after, was followed by his remarks on *The effects of air on human bodies*. A constitutional asthma had distressed him at different periods of his life, and proved fatal to him in 1734.—Dr Arbuthnot appears to have been in all respects a most accomplished and amiable person. He has shewed himself equal to any of his contemporaries in wit and learning, and he was superior to most men in the moral duties of life, in acts of humanity and benevolence. His letter to Mr Pope, written as it were upon his death-bed, and which no one can read without the tenderest emotion, discovers such a noble fortitude of mind at the approach of his dissolution, as could be inspired only by a clear conscience, and the calm retrospect of an uninterrupted course of virtue. In 1751, came out, in two vol. 8vo. printed at Glasgow, *The miscellaneous works of the late Dr Arbuthnot*; which are said to comprehend, with what is inserted in Swift's miscellanies, all the pieces of wit and humour of this admirable author.

ARBUTUS, the STRAWBERRY-TREE; a genus of the monogynia order, belonging to the decandria class of plants.

Species. There are six species of arbutus enumerated by botanical writers; of which the following are the most remarkable. 1. The unedo, or common strawberry-tree. It is a native of Italy, Spain, and also of Ireland; and is now very common in the British gardens. This hath the singular property that its fruit doth not come to perfection till a year after it has flowered; and thus the fruit and flowers are mixed together on the same tree. These trees flower and bear their fruit in the months of October and November; by which means they are great ornaments, the season of most other flowers being then past. Of this species there are several varieties; particularly one withered flowers, which are very beautiful, and may be preserved by inarching

or ingrafting them on the common arbutus. These turn purple before they fall off. There is also a variety with double flowers; but as these have only two rows of leaves, and bear little fruit, the former are preferable. 2. The adrachne, or oriental strawberry-tree, grows naturally in the east, particularly about Magnesia, where it is found in such plenty as to be commonly used for fuel. The leaves are large and oval, serrated while young, but entire after they are two or three years old. The flowers are shaped like those of the common fort, but grow thinly on the branches. The fruit is oval, and of the same colour and consistence with that of the common fort; but the seeds of the adrachne are flat, whereas those of the former species are pointed and angular. The largeness of the leaf of the adrachne gives it a fine appearance, and renders this species well worthy of cultivation.

Culture. The common arbutus is propagated from seeds; to preserve which it is necessary to bury the fruit, as soon as it is perfectly ripe, in dry sand. They are to be sown about the middle or latter end of March in pots, which ought to be plunged into a moderate hot-bed; and, if properly managed, the young plants will be eight or ten inches high before winter. In summer, they will be greatly forwarded by being plunged into an old tan-bed. In the beginning of October, they are to be shaken out of the pots, and the roots carefully separated. They are then to be planted singly in small pots filled with light earth, which should remain during the winter under a common frame, in an old tan-bed. The spring following, they may be plunged into the ground in a sheltered situation, observing to water them frequently in dry weather; but it will be advisable to screen them from frost the following winter, by covering them with mats. This species thrives best in a wet soil, and is seldom hurt by hard winters, though the young and tender branches are often destroyed by frost; but, however dead the trees may appear, they ought always to be suffered to remain till the following summer shews what are living and what are dead.—The adrachne must be preserved in pots for three or four years, till they have obtained strength; and may be then planted in a warm situation, and on a dry soil; for this species will not thrive on wet ground.

ARCADI, or ARCADIAN; the name of a learned society at Rome. See ACADEMY, N° LX. par. 4. et seq.

ARCADIA, an inland district in the heart of Peloponnesus, (Strabo). It is mountainous, and fitter for pasture than corn; and therefore chiefly celebrated by bucolic or pastoral poets, who feign Pan, the god of shepherds, to be the guardian of it, (Virgil). It has to the north Achaia, to the east Argos and Laconia, Messenia to the south, and Elis to the west. According to Pliny, the wine of this country cured barrenness in women, and inspired the men with rage; and the berries of the yew gathered there were so strong a poison, that whoever slept or took refreshment under that tree were sure to die. In Strabo's time there were few cities remaining in it, most of them being destroyed in the Grecian wars. Eustathius says, that the country was anciently called *Pelagasia*, from Pelagos, who brought the people, from roots, herbs, and leaves of trees, to feed on acorns, especially beech-mast; as Artemidorus observes, that the Arcadians usually lived on acorns. It was also called *Lycaonia*, *Gigantiis*, and *Parrhasia*, (Stephanus).

Arbutus
Arbutus.
Arcadia.

Arcangis
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Arch.

(Stephanus). The Arcadians are greatly commended for their love of, and skill in, music, (Virgil, Polybius). To imitate the Arcadians, is to labour and toil for the benefit of others, never conquering their own, but the enemies of others, (Hefychius). This probably took its rise from the ancient Arcadians being accustomed to hire themselves out as mercenaries to foreign nations. Homer commends their martial prowess, their pastures, their sheep, and their country well-watered. The gentilitious name is *Arcades*; who boasted of their great antiquity, and that they were older than the fun and moon: (Apollonius Rhodius, Nonnius, Plutarch, Ovid, Statius). They were the first who had a year of three months, and therefore called *Procleus*, because their year was prior to that adjusted in Greece to the course of the moon, (Censorinus).

ARCANGIS, in the Turkish armies, an inferior kind of infantry, which serve as *enfants perdus*, and to harass and pillage the enemy's frontiers. The Arcangis are an order inferior to the Janissaries; and, when any of them distinguish themselves, are usually preferred into the Janissaries order. They have no pay, but are to subsist on their plunder.

ARCANUM, among physicians, any remedy, the preparation of which is industriously concealed, in order to enhance its value.

ARCBOUTANT, in building, an arched buttress. See *BUTTRESS*.

ARCESILAUS, a celebrated Greek philosopher, about 300 years before the Christian æra, was born at Pitane, in Eolis. He founded the second academy, which is called the *second school*. He was a man of great erudition, and well versed in the writings of the ancients. He was remarkable for the severity of his criticisms; but nevertheless he knew how to accommodate himself to the age, and pursue the allurements of pleasure. He had a great number of disciples. His doctrines were different in several respects from those of the ancient school: and perhaps he was led into this diversity of opinions by many capital errors in the ancient school, such as the incredible arrogance of the dogmatists, who pretended to assign causes for all things; the mysterious air they had thrown upon the doctrine of ideas; the entirely discarding the testimony of the senses; the objections of the Pyrrhonists, who now began to broach their opinions; the powerful opposition of the Stoics and Peripatetics, who discovered the feeble parts of the academic philosophy. These might have given cause to reform the ancient school, and to found a new one. The middle school, therefore, laid it down as a principle, that we could know nothing, nor even assure ourselves of the certainty of this position; from whence they inferred, that we should affirm nothing, but always suspend our judgment. They advanced, that a philosopher was able to dispute upon every subject, and bring conviction with him, even upon contrary sides of the same question; for there are always reasons of equal force both in the affirmative and negative of every argument. According to this doctrine, neither our senses, nor even our reason, are to have any credit; and therefore, in common affairs, we are to conform ourselves to received opinions. Arcesilaus was succeeded by his disciple Læcydes.

ARCH, in geometry, any part of the circumference of a circle or curved line, lying from one point to ano-

ther, by which the quantity of the whole circle or line, or some other thing sought after, may be gathered.

ARCH, a concave or hollowed piece of building, constructed in such a manner that the several stones of which it is composed keep one another in their places. The terms *arch* and *vault* properly differ only in this, that the arch expresses a narrower, and the vault a broader piece of the same kind. The principal difference in the form of arches is, that some are circular, and others elliptical; the former having a larger or smaller part of a circle, the other of an ellipse. What are called *strait arches*, are those frequently used over doors and windows, the upper and under edges of which are strait and parallel, and the ends and joints all pointing toward a centre. The space between two piers of a bridge is called an *arch*, because usually arched over.

Triumphal ARCHES are magnificent entries into cities, erected to adorn a triumph, and perpetuate the memory of the action. The arches of Titus and Constantine make at this time a great figure among the ruins of old Rome.

ARCH, in composition, signifies *chief*, or of the *first* class; as archangel, archbishop, &c.

ARCHÆUS, or ARCHEUS. See *ARCHEUS*.

ARCHANGEL, an angel occupying the eighth rank in the celestial hierarchy *.

ARCHANGEL, a city of Russia, in the province of Dwina, situated on the east side of the river Dwina, about six miles from the White Sea, in E. Long. 40. 21. N. Lat. 64. 30. The city extends about two miles in length, is rich, populous, and built in the modern taste: it is a metropolitan see. Archangel owed its wealth and importance originally to the English, by whom it was discovered in the year 1553. Richard Chancellor, master of one of the ships fitted out under the command of Sir Hugh Willoughby, who had received a commission to go in quest of the north-east passage to China, was separated from the rest of the fleet, and obliged by stress of weather to put into the bay of St Nicholas on the White Sea. The Czar Iwan Basilowitz, being informed of his arrival, invited him to his court, where he was hospitably entertained; and the Czar indulged the English with a free trade in his dominions: in consequence of this permission, a company of merchants was incorporated in London; and, being encouraged by particular privileges from the Czar, set on foot a considerable commerce, to the mutual advantage of both nations. Before this period, the Russian commodities were usually conveyed to Narva, in the gulf of Finland: but the channel of trade was soon turned to Archangel, and this traffic the English for some time enjoyed without competition. The Dutch, however, and other nations, gradually insinuated themselves into this commerce; which they carried on to a very great disadvantage, as not being favoured with those privileges which the Czar had granted to the English company: these were at last unhappily lost, in the time of the great rebellion. When the Czar heard that the English nation had brought their sovereign to the scaffold, he was so exasperated against them, that he forthwith deprived them of the immunities in trade which they had hitherto enjoyed in the dominions of Russia; nor could our company with all its efforts retrieve them in the sequel; so that our merchants were obliged to trade at Archangel the

Arch
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Archangel.

* See *Angel*
and *Hierarchy*.

Archangel the footing of other European nations.

Archamb-
berlain.

The commodities chiefly imported into Archangel, were gold and silver stuffs and laces, gold wire, cochineal, indigo, and other drugs for dyeing; wine, brandy, and other distilled spirits. The customs arising to the Czar were computed at 200,000 rubles a-year, and the number of foreign ships at 400 annually: but since the ports of Petersburg and Riga were opened, great part of the trade has been removed to the Baltic, and the commerce of Archangel is greatly decayed.

The houses of Archangel are generally of wood, but well contrived; and every chamber is provided with a stove, as a fence against the cold, which is here excessive in the winter. The streets are paved with broken pieces of timber and rubbish, disposed so unskilfully, that one cannot walk over it without running the risk of falling, except when the streets are rendered smooth and equal by the snow that falls and freezes in the winter. Notwithstanding the severity of the cold in this place, there is always plenty of good provisions: butcher's meat, poultry, wild fowl, and fish, in great variety, are sold surprisingly cheap. A brace of partridges may be bought for 4 d. These birds, as well as the hares of this country, grow white in the winter; and when the weather becomes more mild, resume their natural colour.

The most remarkable edifice in Archangel is a large town-house, built of square stones in the Italian manner, and divided into three parts. One of these consists of large commodious apartments, for the accommodation of merchants, strangers as well as natives: here they are permitted to reside with their merchandise till the month of October, when all the foreign ships set sail for the respective countries to which they belong. Then the traders are obliged to remove their quarters from the town-house or palace, which hath a spacious court, that reaches down to the river.

ARCHBISHOP, the name of a church dignity of the first class. There are but two now in England, *viz.* those of Canterbury and York.—The archbishop of *Canterbury* is considered as the first peer of England, next to the royal family: he writes himself, by *Divine Providence*; and has the title of *Grace* given him, as to dukes; and likewise *Most Reverend Father in God*. He is styled *Primate of all England, and Metropolitan*.—The archbishop of *York* has precedence of dukes and great officers of state, except the lord chancellor: his title is *Grace, and Most Reverend Father in God*; and writes himself, as other bishops do, by *Divine Permission*. He is styled *Primate of England, and Metropolitan*.

Scotland, whilst episcopacy prevailed in that country, had two archbishops, of *St Andrews* and *Glasgow*; the former of whom was primate of all *Scotland*.

Ireland has four archbishops; of *Armagh*, *Dublin*, *Cassil*, and *Tuam*; of whom the former is primate of all *Ireland*.

ARCHBISHOPRIC, in ecclesiastical geography, a province subject to the jurisdiction of an archbishop.

ARCHBUTLER, one of the great officers of the German empire, who presents the cup to the emperor on solemn occasions. This office belongs to the king of *Bohemia*.

ARCHCHAMBERLAIN, an officer of the empire, much the same with the great chamberlain in England.

The elector of Brandenburg was appointed by the golden bull archchamberlain of the empire.

Archcham-
cellor
Archelaus.

ARCHCHANCELLOR, an high officer who, in ancient times, presided over the secretaries of the court. Under the two first races of the kings of France, when their territories were divided into Germany, Italy, and Arles, there were three archchancellors: and hence the three archchancellors still subsisting in Germany; the archbishop of Mentz being archchancellor of Germany, the archbishop of Cologne of Italy, and the archbishop of Treves of Arles.

ARCHCHANTOR, the president of the chantors of a church.

ARCHCOUNT, a title formerly given to the earl of Flanders, on account of his great power and riches.

ARCHDEACON, an ecclesiastical dignitary or officer next to a bishop, whose jurisdiction extends either over the whole diocese, or only a part of it. He is usually appointed by the bishop himself; and hath a kind of episcopal authority, originally derived from the bishop, but now independent and distinct from his. He therefore visits the clergy; and has his separate court for punishment of offenders by spiritual censures, and for hearing all other causes of ecclesiastical cognizance. There are 60 archdeacons in England.

ARCHDEACON'S Court, is the most inferior court in the whole ecclesiastical polity. It is held, in the archdeacon's absence, before a judge appointed by himself, and called his *official*; and its jurisdiction is sometimes in concurrence with, sometimes in exclusion of, the bishop's court of the diocese. From hence, however, by statute 24 Hen. VIII. c. 12. there lies an appeal to that of the bishop.

ARCHDUKE, a title given to dukes of greater authority and power than other dukes. The archduke of Austria is among the most ancient: his principal privileges are, that he shall distribute justice in his own country, without appeal; that he cannot be deprived of his countries, even by the emperor and the states of the empire; and that he have a power of creating counts, barons, &c. throughout the whole empire.

ARCHELAUS, a celebrated Greek philosopher, the disciple of Anaxagoras, flourished about 440 years before Christ. He read lectures at Athens, and did not depart much from the opinions of his master. He taught that there was a double principle of all things, namely, the *expansion* and *condensation* of the air, which he regarded as infinite. Heat, according to him, was in continual motion. Cold was ever at rest. The earth, which was placed in the midst of the universe, had no motion. It originally resembled a wet marsh, but was afterwards dried up; and its figure, he said, resembled that of an egg. Animals were produced from the heat of the earth, and even men were formed in the same manner. All animals have a soul, which was born with them; but the capacities of which vary according to the structure of the organs of the body in which it resides.—Socrates, the most illustrious of his disciples, was his successor.

ARCHELAUS, the son of Herod the Great, was declared king of Judea the second year after the birth of Christ. He put to death 3000 persons before he went to Rome to be confirmed by Augustus. However, that emperor gave him half of what had been possessed by his father; but at length, on fresh complaints exhibit-
ed

Archelaus ed against him by the Jews, he banished him to Vienne in Gaul, A. D. 6, where he died.

Archil.

ARCHELAUS, the son of Apollonius, one of the greatest sculptors of antiquity, was a native of Ionia, and is thought to have lived in the time of the emperor Claudius. He executed, in marble, the apotheosis of Homer. This masterpiece in sculpture was found in 1568, in a place named *Fratochia*, belonging to the princes of Colonna, where, it is said, the emperor Claudius had a pleasure-house. Father Kircher, Cuper, Spanheim, and several other learned antiquaries, have given a description and explication of this work.

ARCHER, in the ancient military art, one who fought with bow and arrows.

ARCHES-COURT, in English ecclesiastical polity, is a court of appeal, belonging to the archbishop of each province; whereof the judge is called the *dean of the arches*, because he anciently held his court in the church of St Mary le bow (*sancta Maria de arcubus*), though all the principal spiritual courts are now holden at Doctors' Commons. His proper jurisdiction is only over the 13 peculiar parishes belonging to the archbishop in London; but the office of dean of the arches having been for a long time united with that of the archbishop's principal office, he now, in right of the last mentioned office, receives and determines appeals from the sentences of all inferior ecclesiastical courts within the province. And from him there lies an appeal to the king in chancery (that is, to a court of delegates appointed under the king's great seal) by statute 25 Hen. VIII. c. 19. as supreme head of the English church, in the place of the bishop of Rome, who formerly exercised this jurisdiction; which circumstance alone will furnish the reason why the Popish clergy were so anxious to separate the spiritual court from the temporal.

ARCHETYPE, the first model of a work, which is copied after to make another like it.—Among minters, it is used for the standard weight by which the others are adjusted.—The archetypal world, among Platonists, means the world as it existed in the idea of God before the visible creation.

ARCHEUS, (from ἀρχη, the principal, chief, or first mover); a sort of primum mobile set up by Helmont, to superintend the animal œconomy, and preserve it. It is akin to Plato's *anima mundi*.—Hippocrates uses the words ἀρχαὶ πνεύμα, to signify the former healthy state before the attack of the disease.

ARCHIEROSYNES, in the Grecian antiquity, a high priest vested with authority over the rest of the priests, and appointed to execute the more sacred and mysterious rites of religion.

ARCHIL, ARCHILLA, ROCELLA, ORSIELLE, is a whitish moss which grows upon rocks, in the Canary and Cape Verd islands, and yields a rich purple tincture, fugitive indeed, but extremely beautiful. This weed is imported to us as it is gathered. Those who prepare it for the use of the dyer, grind it betwixt stones, so as to thoroughly bruise, but not to reduce it into powder; and then moisten it occasionally with a strong spirit of urine, or urine itself mixed with quicklime: in a few days it acquires a purplish red, and at length a blue colour. In the first tincture, it is called *Archil*; in the latter, *Lacmus* or *Litmase*.

The dyers rarely employ this drug by itself, on ac-

count of its dearth and the perishableness of its beauty. The chief use they make of it is, for giving a bloom to other colours, as pinks, &c. This is effected by passing the dyed cloth or silk through hot water lightly impregnated with the archil. The bloom thus communicated soon decays upon exposure to the air. Mr Hellot informs us, that by the addition of a little solution of tin, this drug gives a durable dye; that its colour is at the same time changed towards a scarlet; and that it is the more permanent, in proportion as it recedes the more from its natural colour.

Prepared archil very readily gives out its colour to water, to volatile spirits, and to spirit of wine; it is the substance principally made use of for colouring the spirits of thermometers. As exposure to the air destroys its colour upon cloth, the exclusion of the air produces a like effect in these hermetically sealed tubes, the spirits of large thermometers becoming in the compass of a few years colourless. M. l'Abbe Nollet observes, (in the French Memoirs for the year 1742), that the colourless spirit, upon breaking the tube, soon resumes its colour, and this for a number of times successively; that a watery tincture of archil, included in the tubes or thermometers, lost its colour in three days; and that, in an open deep vessel, it became colourless at the bottom, while the upper part retained its colour.

A solution of archil in water, applied on cold marble, stains it of a beautiful violet, or purplish blue colour, far more durable than the colour which it communicates to other bodies. Mr du Fay says he has seen pieces of marble stained with it, which in two years had suffered no sensible change. It sinks deep into the marble, sometimes above an inch; and at the same time spreads upon the surface, unless the edges be bounded by wax or other like substances. It seems to make the marble somewhat more brittle.

Linnaeus informs us, in the Swedish Transactions for the year 1742, that the true archil moss is to be found on the western coasts of England.

ARCHILOCHIAN, a term in poetry, applied to a sort of verses, of which Archilochus was the inventor, consisting of seven feet, the four first whereof are ordinarily dactyls, though sometimes spondee; the three last trochees; as in Horace,

Solvitur acris hyena, grata vice veris & Favoni.

ARCHILOCHUS, a famous Greek poet and musician, was, according to Herodotus, cotemporary with Candaules and Gyges, kings of Lydia, who flourished about the 14th Olympiad, 724 years before Christ. But he is placed much later by modern chronologists; viz. by Blair 686, and by Priestly 660 years, B. C.

He was born at Paros, one of the Cyclades. His father Telecles was of so high a rank, that he was chosen by his countrymen to consult the oracle at Delphos concerning the sending a colony to Thafos: a proof that he was of one of the most distinguished families upon the island. However, he is said to have sullied his birth by an ignoble marriage with a slave called *Enipo*, of which alliance our poet-musician was the fruit.

Though Archilochus shewed an early genius and attachment to poetry and music, these arts did not prevent his going into the army, like other young men of his birth: but in the first engagement at which he was present,

Archil
Archilo-
chus.

Archilochus.

present, the young poet, like Horace, and like our own Suckling, lost his buckler, though he saved his life by the help of his heels. *It is much easier, said he, to get a new buckler, than a new existence.* This pleasantry, however, did not save his reputation; nor could his poetry or prayers prevail upon Lycambes, the father of his mistress, to let him marry his daughter, though she had been long promised to him. After these mortifications, his life seems to have been one continued tissue of disgrace and repentment.

Archilochum proprio rabies armavit iamblo.

HOR. ART. POET. 79.

Archilochus, with fierce resentment warm'd,

Was with his own fierce iambics arm'd. FRANCIS.

The *rage of Archilochus* was proverbial in antiquity; which compared the provoking the satyrist to the treading upon a serpent: A comparison not very severe, if it be true that Lycambes, and, as some say, his three daughters, were so mortified by his satire, as to be driven to the consolation of a halter.

In this piece, many adventures are mentioned, full of defamation, and out of the knowledge of the public. There were likewise many loose passages in it; and it is said to have been on account of this satire that the Lacedæmonians laid a prohibition on his verses*.

However, according to Plutarch, there is no bard of antiquity by whom the two arts of poetry and music have been so much advanced, as by Archilochus. To him is attributed particularly the sudden transition from one rhythm to another of a different kind, and the manner of accompanying those irregular measures upon the lyre. Heroic poetry, in hexameter verse, seems to have been solely in use among the more ancient poets and musicians; and the transition from one rhythm to another, which lyric poetry required, was unknown to them: so that, if Archilochus was the first author of this mixture, he might with propriety be styled the *Inventor of Lyric Poetry*, which, after his time, became a species of versification wholly distinct from heroic.—To him is likewise ascribed the invention of *Epodes*. See ERONE.

Our poet-musician is generally ranked among the first victors of the Pythic games: and we learn from Pindar, that his muse was not always a termagant; for though no mortal escaped her rage, yet she was at times sufficiently tranquil and pious to dictate hymns in praise of the gods and heroes. One in particular, written in honour of Hercules, acquired him the acclamations of all Greece; for he sung it in full assembly at the Olympic games, and had the satisfaction of receiving from the judges the crown of victory consecrated to real merit. This hymn, or ode, was afterwards sung in honour of every victor at Olympia, who had no poet to celebrate his particular exploits.

Archilochus was at last slain by one Callondax Corax, of the island of Naxos; who, though he did it in fight, according to the laws of war, was driven out of the temple of Delphi, by command of the oracle, for having deprived of life a man consecrated to the Muses.

The names of Homer and Archilochus were equally revered and celebrated in Greece, as the two most excellent poets which the nation had ever produced. This appears from an epigram in the *Anthologia*; and from Cicero, who ranks him with poets of the first class, and in his *Epistles* tells us, that the grammarian Aristophanes, the most rigid and scrupulous critic of his time, used to

say, that the longest poem of Archilochus always appeared to him the most excellent.

ARCHIMAGUS, the high-priest of the Persian Magi or worshippers of fire. He resided in the highest fire-temple; which was had in the same veneration with them, as the temple of Mecca among the Mahometans. Zoroastres first settled it at Balch; but after the Mahometans had over-run Persia in the 7th century, the Archimagus was forced to remove from thence into Kerman, a province of Persia, lying on the southern ocean, where it hath continued to this day. Darius Hytaspes took upon himself the dignity of Archimagus: for Porphyry tells us, he ordered before his death, that, among the other titles, it should be engraven on his monument, that he had been *Master of the Magi*; which plainly implies that he had born this office among them, for none but the Archimagus was master of the whole sect. From hence it seems to have proceeded, that the kings of Persia were ever after looked on to be of the sacerdotal tribe, and were always initiated into the sacred order of the Magi, before they took on them the crown, and were inaugurated into the kingdom.

ARCHIMANDRITE, in ecclesiastical history, was a name given by the ancient Christians to what we now call an *abbot*. Father Simon observes, that the word *mandrite* is Syriac, and signifies a solitary monk.

ARCHIMEDES, a celebrated geometrician, born at Syracuse in the island of Sicily, and related to Hiero king of Syracuse. He was remarkable for his extraordinary application to mathematical studies; in which he used to be so much engaged, that his servants were often obliged to take him from thence by force. He had such a surprising invention in mechanics, that he affirmed to Hiero, if he had another earth, whereon to plant his machines, he could move this which we inhabit. He is said to have formed a glass sphere, of a most surprising workmanship, wherein the motions of the heavenly bodies were represented. He discovered the exact quantity of the silver which a goldsmith had mixed with the gold, in a crown he had made for the king: he had the hint of this discovery from his perceiving the water rise up the sides of the bath as he went into it, and was filled with such joy, that he ran naked out of the bath, crying, "I have found it! I have found it!" By the invention of machines, he, for a long time, defended Syracuse*, on its being besieged

* See SYRACUSE.

by Marcellus. On the city's being taken, that general commanded his soldiers to have a particular regard to the safety of this truly great man; but his care was ineffectual. "What gave Marcellus the greatest concern (says Plutarch), was the unhappy Archimedes, who was at that time in his museum, and his mind, as well as his eyes, so fixed and intent upon some geometrical figures, that he neither heard the noise and hurry of the Romans, nor perceived the city was taken. In this depth of study and contemplation, a soldier came suddenly upon him, and commanded him to follow him to Marcellus; which he refusing to do till he had finished his problem, the soldier, in a rage, drew his sword, and ran him through the body." Others have related the circumstances of his death in a somewhat different manner. It however happened 208 years before the Christian æra. Cicero, when he was quaestor in Italy, dis-

Archilochus
||
Archimedes

* Val. Max.
lib. vi. c. 3.

Archimedes discovered his tomb, on which was carved a cylinder and sphere †. Some of the works of this great mathematician are lost, but others are preserved. His pieces which remain are, 1. Two books of the Sphere and Cylinder. 2. The Dimensions of a Circle. 3. Of Centres of Gravity, or *Æquiponderants*. 4. Of Spheroids and Conoids. 5. Of Spiral Lines. 6. The Quadrature of a Parabola. 7. Of the Number of the Sand. 8. Of Bodies that float on Fluids. The best edition of these is that published at London, in 1675, 4^{to}. Among the works of Archimedes which are lost, we may reckon the descriptions of the following inventions, which we may gather from himself and other ancient authors. 1. *Περὶ τῆς σφαιρῆς*, or his account of the method which he used to discover the mixture of gold and silver in the crown. 2. His description of the *Καρχήνη*, or *Καρχήνη*, an engine to draw water out of places where it is stagnated. Athenæus, speaking of the prodigious ship built by the order of Hiero, tells us, that Archimedes invented the cochlion, by means of which the hold, notwithstanding its depth, could be drained by one man. (*Διπλοσφαιριον*, lib. v.) Diodorus Siculus informs us (lib. v.) that he contrived this machine to drain Egypt, and that by a wonderful mechanism it would empty the water from any depth. 3. The *Ὑδρῆς*, by means of which (according to Athenæus, *Διπλοσφαιριον*, lib. v.) he launched Hiero's great ship. 4. The *Τριπλοσφαιριον*, of the power of which Tzetzes gives a hyperbolic relation, Chil. ii. hist. 35. 5. The machines he

used in the defence of Syracuse against Marcellus. Of these we have an account in Polybius, Livy, and Plutarch. 6. His burning-glasses, with which he is said to have set fire to the Roman galleys. Galen, *Περὶ ἰσχυριῶν*, lib. iii. 7. His pneumatic and hydraulic engines, concerning which he wrote books, according to Tzetzes, Chil. ii. hist. 35.

ARCHIPELAGO, in geography, a general term signifying a sea interrupted with islands; it is however more especially applied to that lying between Europe and Asia, which contains the islands anciently called *Cyclades* and *Sporades*. See these two words.

ARCHPRESBYTER, or ARCH-PRIEST, a priest established in some dioceses with a superiority over the rest. He was anciently chosen out of the college of presbyters, at the pleasure of the bishop. These arch-presbyters were much of the same nature with deans in the cathedral churches, as the college of presbyters answers to the chapter. See PRESBYTER.

ARCHISYNAGOGUS, the chief of the synagogue; the title of an officer among the Jews, who presided in their synagogues and assemblies. The number of these officers was not fixed, nor the same in all places; there being 70 in some, and in others only one. They are sometimes called *princes* of the synagogue, and had a power of excommunicating such as deserved that punishment.

ARCHITECT, a person skilled in architecture.

A R C H I T E C T U R E,

IN the utmost latitude of the word, signifies the art of building in general; but the term is most frequently applied only to the construction of such buildings as are for the purposes of civil life, such as houses, halls, churches, bridges, porticos, &c.

History of Architecture.

THE origin of this art, like that of most others, is totally unknown. We are assured, however, that it is as old as Cain: for Moses tells us that he built a city; tho' what were the materials, or how the buildings were constructed, we are entirely ignorant. It is commonly said, that the first materials employed in building were branches and twigs of trees, wherewith men constructed huts, such as the *wigwams* in use among the American Indians at present. This, however, appears disputable. The natural shelter afforded by hollows in the sides of mountains or rocks, it may be supposed, would much more readily suggest the idea of using stones and earth as materials for building houses. Indeed, considering that tents were not invented before the days of Jabel, Tubal-Cain's brother, it is very probable that such temporary houses as the Indian wigwams were not originally known; otherwise the method of covering poles with the skins of beasts, instead of small branches or twigs, must very soon have taken place. These temporary houses seem to have come into use only when men began to lead an idle wandering life, like the Tartars, and could not be at the trouble of constructing durable habitations in every place where they were obliged to wander with their cattle; and Jabel no doubt from them took the hint of making por-

table houses, or tents. Accordingly we see, that no nations, except those who are in a perpetually unsettled state, make use of such wretched materials. Even in America, where the human race have appeared in the most despicable form, they were no sooner collected into great bodies under the emperors of Mexico and Peru, who forced them to leave off their wandering way of life, than stone-buildings began to be erected.

We are not, therefore, to look for the origin of architecture in any single nation; but in every nation, when the inhabitants began to leave off their savage way of life, and to become civilized; and if there is any nation to be found which hath been always in a civilized state, we may be assured that architecture hath always had an existence there. But whatever may be in this, the origin of regular buildings hath been deduced from the construction of the meanest huts in a very natural and plausible manner by several authors. "Anciently (says Vitruvius), men lived in woods, and inhabited caves; but in time, taking perhaps example from birds, who with great industry build their nests, they made themselves huts. At first they made these huts, very probably, of a conic figure; because that is a figure of the simplest structure; and, like the birds, whom they imitated, composed them of branches of trees, spreading them wide at the bottom, and joining them in a point at the top; covering the whole with reeds, leaves, and clay, to screen them from tempests and rain.

"But finding the conic figure inconvenient on account of its inclined sides, they changed both the form and construction of their huts, giving them a cubical figure,

² Primit^{ve} huts.
Plate XXV.
(a) fig. 1.

³ Their improvement.

Archimedes
† Tufent.
Quest. lib.
iv.

Of Archipelago
Architect.

² Materials
first used in
building.

Plate XXV.
(n). fig. 2.

figure, and building them in the following manner: "Having marked out the space to be occupied by the hut, they fixed in the ground several upright trunks of trees to form the sides, filling the intervals between them with branches closely interwoven and covered with clay. The sides being thus completed, four large beams were placed on the upright trunks; which, being well joined at the angles, kept the sides firm, and likewise served to support the covering or roof of the building, composed of many joists, on which were laid several beds of reeds, leaves, and clay.

"Inferiably mankind improved in the art of building, and invented methods to make their huts lasting and handsome, as well as convenient. They took off the bark, and other unevennesses, from the trunks of trees that formed the sides; raised them, probably, above the dirt and humidity, on stones; and covered each of them with a flat stone or slate, to keep off the rain. The spaces between the ends of the joists were closed with clay, wax, or some other substance; and the ends of the joists covered with thin boards cut in the manner of triglyphs. The position of the roof was likewise altered: for being, on account of its flatness, unfit to throw off the rains that fell in great abundance during the winter season, they raised it in the middle; giving it the form of a gable roof, by placing rafters on the joists, to support the earth and other materials that composed the covering.

Fig. 3.

"From this simple construction the orders of architecture took their rise. For when buildings of wood were set aside, and men began to erect solid and stately edifices of stone, they imitated the parts which necessity had introduced into the primitive huts; in so much that the upright trees, with the stones at each end of them, were the origin of columns, bases, and capitals; and the beams, joists, rafters, and struts of materials that formed the covering, gave birth to architraves, frizes, triglyphs, and cornices, with the corona, the mutules, the modillions, and the dentils.

"The first buildings were in all likelihood rough and uncouth; as the men of those times had neither experience nor tools: but when, by long experience and reasoning upon it, the artists had established certain rules, had invented many instruments, and by great practice had acquired a facility in executing their ideas, they made quick advances towards perfection, and at length discovered certain manners of building, which succeeding ages have regarded with the highest veneration."

State of architecture among the Egyptians.

Among the ancient Egyptians, Assyrians, and Persians, this art was carried to an incredible length. The pyramids of Egypt are such structures as would exceed the power of the most potent monarch on earth to raise at this day. The largest of these, according to the account of M. Goguet, is near 500 feet high, and contains 313,590 solid fathoms. It is composed of stones enormously large; many of them being 30 feet long, four feet high, and three in breadth; and all this huge mass of building was coated over with square flags of marble.—The structure called the *labyrinth*, in the same country, according to Herodotus, who saw it, excelled every thing which he could have conceived from the imagination either of himself or others. Within the same circuit of walls they had inclosed 3000 halls, 12 of which were of a singular form and beauty; and of these, half were above, and half

below ground; and the whole was terminated by a pyramid 40 fathoms high. All this prodigious mass of building was composed of white marble, and the walls were adorned with engravings.—The obelisks were not less astonishing; the largest of them being entire pieces of granite, no less than 180 feet high.—Near Andera, in upper Egypt, are the ruins of a palace of gray granite, the ceilings of which are supported by columns of such thickness, that four men can scarcely fathom them. The ceilings themselves are composed of stones of the same kind, six or seven feet in breadth, and 18 feet in length. The grand hall is 112 feet long, 60 high, and 58 broad. The roof of the whole edifice is a terrace, on which the Arabs formerly built a very large village, the ruins of which are still visible.

Among the Babylonians and Persians, too, such immense piles of building have been raised, as appear utterly inconceivable, and incredible to many modern authors where their former grandeur is not demonstrable by ruins visible at this day. The ruins of Persepolis, the ancient capital of Persia, were so stupendous in the time of Avicenna the Arab physician, that his countrymen could not believe such structures possible to be erected but by evil spirits. Of their extraordinary magnificence, indeed, we may have some idea from the account of the stair-cases belonging to the palace. The remains, some time ago, consisted of 95 steps of white marble, so broad and flat, that 12 horses might conveniently go up abreast.

In these vast structures, however, the nations of whom we speak seem to have regarded the greatness, rather than the elegance or usefulness, of their works. In the pyramids and obelisks of Egypt this is exceedingly conspicuous; but whether it was so in the labyrinth, or in the palace at Thebes above-mentioned, it is impossible to determine, unless the buildings were entire, and we knew for what purpose they had been designed. If the kings who built the pyramids designed to immortalize their memories by building, they certainly could not have fallen upon any thing more proper for this purpose; though even in this they have some how or other failed, the names of those who erected them not being certainly known even in the time of Herodotus.—It is certain, however, that neither the ancient Assyrians nor Babylonians knew the method of constructing arches. The roofs of all their halls were flat, and covered with prodigiously large stones, some of them so big as to cover a whole room singly. Their manner of building was also quite destitute of what is now called *taste*; the columns were ill-proportioned, and their capitals executed in the poorest manner imaginable. This was observed by the Greeks, who improved upon the proportions formerly used, and were the inventors of three of the five orders of architecture, *viz.* the Doric, Ionic, and Corinthian.

"Anciently," (says Vitruvius), they were ignorant of the art of proportioning the various parts of a building: they used columns; but they cut them at hazard, without rules, without principles, and without having any attention to the proportions which they ought to give them: they placed them likewise without any regard to the other parts of the edifice. Dorus, son of Helen and grandson of Deucalion, having caused a temple to be built at Argos in honour of Juno, that edifice was found by chance to be constructed according to the taste and proportions of the

Among the Babylonians and Persians.

Their buildings more remarkable for greatness than elegance.

Ignorant of the use of arches.

And of proportioning columns.

Origin of the Doric order.

the order which afterwards they called *Doric*. The form of this building having appeared agreeable, they conformed to it for the construction of edifices which they afterwards had to build.

"About the same time, the Athenians sent into Asia a colony under the conduct of Ion, nephew of Dorus: this undertaking had very good success. Ion seized on Caria, and there founded many cities: these new inhabitants thought to build temples. They proposed for a model that of Juno at Argos; but, ignorant of the proportion which they ought to give to the columns, and in general to the whole edifice, they sought for rules capable of regulating their operation. These people wanted, in making their columns sufficiently strong to support the whole edifice, to render them at the same time agreeable to the sight. For this purpose, they thought to have given it the same proportion that they found between the foot of a man and the rest of his body. According to their ideas, the foot made a sixth part of the human height: in consequence, they gave at first to a Doric column, taking in its chapter, six of its diameters; that is to say, they made it six times as high as it was thick: afterwards they added to it a seventh diameter.

to
Of the Ionic.

"This new order of architecture was not long in giving birth to a second: they would immediately go beyond their first invention. The Ionians tried to throw still more delicacy and elegance into their edifices. They employed the same method which they had before put in practice for the composition of the Doric order: but instead of taking for a model the body of a man, the Ionians were regulated by that of a woman. With a view to make the columns of this new order more agreeable and more pleasing, they gave them eight times as much height as they had diameter. They also made channelings all along the trunk to imitate the folds of the robes of women: the volutes of the chapter represented that part of the hair which hung in curls on each side of the face. The Ionians added, lastly, to these columns a base, which was not in use in the Doric order." According to Vitruvius, these bases were made in the manner of twisted cords, as a kind of case for the columns. This order of architecture was called *Ionic*, from the name of the people who had invented it.

Such is the account given by Vitruvius of the origin of improvements in the proportion of columns. Had these improvements, however, existed in such early times, Homer, who was greatly posterior to them, would certainly have made mention of something of that kind; but in all his writings he gives us no account of any thing like columns of stone, but uses a word which would rather incline us to think that his columns were nothing more than bare poles.

11
Hints of improvement probably taken from Solomon's temple.

It is remarkable, that improvements in architecture did not take place in any nation till after, or about, the time that Jerusalem was taken by Nebuchadnezzar. The grandest buildings erected among the Assyrians seem to have owed their existence to this monarch; and it can scarce be imagined that he would not endeavour to imitate the architecture of Solomon's temple, to which, by his conquest of Jerusalem, he had full access.—It is also remarkable, that the dimensions of the two pillars, Jachin and Boaz, set up by Solomon, very nearly correspond with those of the Doric order, first

invented by the Greeks, and which originally came from their colonies settled in Asia Minor. The height of Solomon's pillars, without the chapter, was 18 cubits; that of the chapter itself was five cubits; the circumference was 12 cubits; from whence, according to the Scripture language, we may reckon the diameter to have been exactly four cubits. Had they been a single cubit higher, they would have been precisely of the same height with columns of the original Doric order. We do not indeed mean to assert, that this famous temple gave a model of architecture to the whole world; although it is scarce conceivable, but imitations of it, as far as it could be known, must have taken place among many nations.

Notwithstanding all their defects, however, the Egyptian buildings undoubtedly had an air of vast grandeur and magnificence, if we may credit the description given of one of their banqueting rooms by Vitruvius. The usual size of one of these rooms was from 100 to 150 feet in length, and its breadth somewhat more than half its length. At the upper end, and along the two sides, they placed rows of pillars tolerably well proportioned to one another, though not of any regular order; and at the lower part they made a magnificent and spacious entrance: this, with its ornaments, seems to have taken up one end of the building entire. We are not told that there were any pillars there; tho' perhaps they placed two or more toward the angles on each side, for uniformity, the central space being enough for an entrance in the grandest and most august manner. These rows of columns were set at a distance from the wall, forming a noble portico along the two sides and upper end of the building. Upon the pillars was laid an architrave; and from this was carried up a continued wall with three quarter columns, answering directly to those below, and in proportion one fourth smaller in all their parts. Between these three quarter columns were placed the windows for enlightening the building. From the tops of the lower pillars to the wall was laid a floor: this covered the portico overhead within, and made on the outside a platform, which was surrounded by a corridor with rails and balusters. This was terraced, and served as a plain for people to walk on; and from this they could look through the windows down into the room. To this terrace there was no covering required, as the Egyptians were in no fear of rain. The Egyptians decorated this sort of building with statues; and no kind of ornament could answer it so well, as the light cannot fall upon statues to such advantage in any direction, as when it comes from above, in such a regular, proportioned, and uninterrupted manner.

12
Egyptian
banqueting
room described.

We have already taken notice, that among the ancient Egyptians, Persians, and Babylonians, the vast strength and extent of their buildings seems to have been what they chiefly valued; and in this they certainly as much excelled the Greeks and modern nations, as the latter excel them in the beautiful proportion and elegance of their structures. There are not wanting, however, some modern authors, who endeavour to deprive the ancients of what is justly their due, and will have every thing to be exaggerated which seems beyond the power of modern princes to accomplish. In this way M. Goguet remarkably distinguishes himself, and that without giving any reason at all, but merely

13
Ancient architecture superior in grandeur to the modern.

that he takes it into his head. Speaking of the wonders of ancient Babylon, "All these works (says he), so marvellous in the judgment of antiquity, appear to me to have been extremely exaggerated by the authors who have spoken of them. How can we conceive, in effect, that the walls of Babylon could have been 318 feet high, and 81 in thickness, in a compass of near ten leagues?" To this we may easily reply, that the pyramids of Egypt, and the immense wall which divides China from Tartary, shew us, that even such a work as the wall of ancient Babylon is said to have been is not altogether incredible. The lowest computation of the dimension of the Chinese wall is, that it extends in length 1200 miles, is 18 feet high at a medium, and as many thick; according to which computation, it must contain 9,504,000 solid fathoms; and yet, if we may credit the Chinese historians, this immense mass of building was finished in five years. If therefore we can suppose Nebuchednezzar, or whoever fortified the city of Babylon, to have been capable of employing as many men for ten years as were employed in raising the Chinese wall, we may suppose him able to have fortified the city of Babylon as strongly as it is said to have been; for the mass of building is not quite double that of the Chinese wall, though nearly so, amounting to 18,189,600 solid fathoms. When our author afterwards galleonades about the works of the French king, it is difficult to avoid laughter at hearing him declare, that "infinitely more money has been expended, and much more genius required, as well as more power, taste, and time, to finish Versailles, with all its defects, than to construct a pyramid, or erect an obelisk." The genius, taste, and time, we shall not dispute; but as the same author confesses that 100,000 men were employed for 30 years together in the construction of the largest pyramid, we think the power may justly be doubted. This doubt will appear still the more reasonable, when we consider what time the abovementioned number of men would have taken to accomplish some of the works of which M. Goguet boasts so much. The canal of Languedoc, he tells us, extends in length upwards of 70 leagues, and required the removal of two millions of cubic fathoms of earth. This was no doubt a great work; but had 100,000 men been employed upon it at once, they must have removed this quantity of earth in three weeks, supposing each to have removed only a single fathom a-day. Nor can we imagine, that any modern work will at all stand in competition with the works of the ancients as to greatness, whatever they may do in other respects.

14
Architecture improved by the Greeks.

As to the improvements in architecture, the Greeks were undoubtedly the first European nation who began to distinguish themselves in this way. Whence they took the first hint of improvement, we have no means of knowing; though, as we have already hinted, it is scarce credible but that Solomon's temple must have somewhat contributed thereto; especially as we learn from Scripture, that the capitals of the columns there were ornamented in the richest manner. The origin of the Doric and Ionic orders we have already given an account of from Vitruvius; to which we may add, that the volutes, which are the peculiar ornament of the Ionic capital, are by some said to represent the natural curling down of a piece of bark from the top of a beam, which is supposed to have been the first kind of

column.—The Corinthian order was not invented till long after the others, and is said to have taken its rise from the following accident: A basket had been set upon the ground, and covered with a square tile; there grew near it a plant of acanthus or bears-breech; the leaves shot up and covered the outer surface of the basket; and as the stalks rose up among them, they soon reached the tile which overhung the edges of the basket at the top; this stopping their course upwards, they curled and twisted themselves into a kind of volutes. In this situation a sculptor, Callimachus, saw it; the twisted part of the stalk represented to him the volutes of the Ionic capital, which, as they were here smaller, and more numerous, appeared in a new form: he saw the beauty of raising them among leaves, and was struck with the representation of a noble and lofty capital; which being afterwards put into execution, has been universally admired.

15
Private houses of the Greeks.

In their private houses the Greeks had great conveniences, but much less magnificence than the Romans, as the former reserved the use of their grandest architecture for their temples and public buildings. The entrance to their private houses, however large they were, was always small, narrow, and plain. The whole edifice usually consisted of two courts, and several ranges of buildings. The porter's lodge, if such a phrase may be allowed, was usually on the right hand of this narrow entrance, and opposite to this were the stables. From this entrance one came into the first or smaller court. This had piazzas on three sides; and on the fourth, which was usually the south side, there were buttments of pilasters, which supported the more inward parts of the ceiling.—A space being thus left between the one and the other, they had places for the lodgings of men and maid servants, and such as had the principal care of the house. Upon the same floor with these buttments they had several regular apartments, consisting of an antichamber, a chamber, and closets; and about the piazzas, rooms for eating and other common purposes.—Opposite to the entrance was a lobby or vestibule, through which lay the passage into the several rooms; and through this, in front, one entered a large passage, which led into the larger or principal square. Round this they had four piazzas, which, in the common way of building, were all of one height; but, in more magnificent houses, they made that which faced the great entrance loftier, and every way nobler, than the other three. A nobleman of Rhodes added this to the common method of building; and it was thence called the *Rhodian* manner. In this more noble part of the building were the apartments of the family. These were adorned with lofty galleries, and here were the best rooms: they were called the mens apartments; for, in rude times, the Greeks lodged their wives and female relations in the best rooms of the first court, where they had also their separate and detached place. The two sides of this larger court were kept for the reception of visitors; and servants were appointed to wait upon them. The master of the house entertained his guests the first day in his own apartments; but after this, how long soever they staid, they lived without restraint in one of those separate piazzas, and joined the family only when they chose it. Thus was the upper end and two sides of the great court disposed of; and its lower end, being the same range of building that

was

was the upper end of the first court, held the lady of the house and her female friends.

The Romans borrowed their architecture from the Greeks, but did not imitate them in the modesty of their private dwellings. They placed the principal front of their house towards the south, and on this they bestowed all the decoration of expensive ornament. They had here lofty galleries and spacious rooms, and every thing carried an air of greatness and shew. In their country houses they preferred the same situation, and the same front; but the inner distribution was different. At the entrance they placed the meaner and more offensive offices, after the manner of the Greeks. The first gallery, which received the stranger at his entrance, had on one side a passage to the kitchen, and on the other to the stalls where they kept cattle, that their noise or smell might not be offensive within, while yet they were in readiness for all services. These stalls were placed to the left, as in the Greek houses; on the right was the kitchen, which had its light from above, and its chimney in the middle. Farther within the building were placed on one side bathing rooms, and on the other family-conveniences, in the manner of our buttries and store-rooms: the bathing rooms were on the left, and the others on the right. Backwards, and full to the north, they placed their cellars, for fear of the sun; and over these were other store-rooms. From this part of the structure one came into the court; for in these there generally was only one court: this was taken up by servants, and those who had the care of the cattle; and on each side there were stalls for the cattle. In front from the entrance, but very far from all these annoyances, stood the nobler apartments for the master of the family.

How magnificent the Romans were in their temples and public buildings, is yet to be seen in what remains of them, and which are not only models for all modern architects, but have never been surpassed or even equalled to this day. But though the art of architecture continued almost at its highest pitch among the Romans for two centuries, it declined exceedingly as the empire began to fail. Tacitus relates, that after the battle of Actium no men of genius appeared; and after the reign of Alexander Severus, a manner of building altogether confused and irregular was introduced, wherein nothing of the true graces and majesty of the former was preserved. When the empire was entirely over-run by the Goths, the conquerors naturally introduced their own method of building. Like the ancient Egyptians, the Goths seem to have been more studious to amaze people with the greatness of their buildings, than to please the eye with the regularity of their structure, or the propriety of their ornaments. They corrected themselves, however, a little by the models of the Roman edifices which they saw before them: but these models themselves were faulty; and the Goths being totally destitute of genius, neither architecture, nor any other art, could be improved by them.

When the Arabs conquered Spain, they introduced a mode of architecture which was just the reverse of the Gothic. This was as remarkable for its lightness as the Gothic was for its clumsiness; and the fantastic genius of the Arabs displayed itself in the great number of superfluous and unnatural ornaments wherewith it was loaded. Examples of this kind of building are extant

in some cathedrals in Spain built by the Moors, particularly that of Burgos. It is falsely, though commonly, called the *modern Gothic*.

In the 15th and 16th centuries, when learning of all kinds began to revive, architecture seemed as it were to be recalled into life. The first improvements in it began in Italy, and owed their existence to the many ruins of the ancient Roman structures that were to be found in that country, from whence an improved method of building was gradually brought into the other countries of Europe: and though the Italians for a long time retained the superiority as architects over the other European nations; yet, as men of genius travelled from all quarters into Italy, where they had an opportunity of seeing the originals from whence the Italians copied, architects have arisen in other nations equal, if not superior, to any that ever appeared in Italy. Of this we have a recent instance in our own countryman Mr Mylne, who lately gained the prize in architecture at Rome, where it would no doubt be disputed by such natives of Italy as were best skilled in that art.

We shall conclude this history with an account of the mode of architecture followed by those nations who never had any connection either with the Jews, Greeks, or Romans, and whose manner of building must consequently be reckoned quite original, and peculiar to themselves. These nations are the Chinese, the Americans, and the ancient Celts; by the last of which the island of Britain most probably was first peopled. The first are a very ingenious people, and pretend to be of very high antiquity; but their architecture is universally allowed to be much inferior to that of the Greeks and Romans. It is true, they excelled the ancient Egyptians in knowing the method of constructing arches; but though they make use of arches in constructing bridges, and build some of these of a prodigious height and length, they seem strangely deficient in the knowledge of finishing them with propriety. Their method of building them is as follows: As soon as they finish the sides of the arch next to the land, or, if there are more arches than one, as soon as they finish the piers that stand between them, they proceed to lay on the stones (which are commonly about four or five feet long, and half a foot broad) alternately upright and crosswise, so that the key-stones always lie horizontally. The top of the arch is usually no thicker than these stones; and because the bridges, especially those that have but one arch, are sometimes 40 or 50 feet between the piers, and consequently much higher than the causeway, they make an ascent on both sides by steps about three inches thick; the inconvenience of which for horses and carriages is very evident. In other respects, however, the Chinese bridges are well built, and some of them exceedingly beautiful. One in particular, near Pekin, was built of white marble curiously wrought and polished. It had 70 pillars on each side, divided by corbels of fine marble, beautifully carved with flowers, foliage, birds, beasts, and a variety of other ornaments. On each side of the entrance on the bridge, at the east end, stood two lions of an extraordinary size, on two marble pedestals, with several other smaller lions in different attitudes. At the other end of the bridge stood likewise two curious pedestals, on which were skilfully carved two children; and all the rest of the

17
Of the Romans.

18
Decline of the art among the Romans.

19
Gothic manner of building.

20
Arabian manner.

21
Revival of the art.

22
Chinese bridges.

the workmanship was answerable to it.

The size of some of the Chinese bridges is astonishing; some of them consisting of above 100 lofty arches, and being upwards of 160 fathoms in length. A very surprising one is to be seen at the city of Swen-chew-fu, built over the point of an arm of the sea, which otherwise must be crossed in a bark, and often not without danger. It is 2520 Chinese feet in length, and 20 in breadth; and is supported by 252 huge piers, 126 on each side. All the stones of it are of a greyish colour, and of such a length and thickness as to go across from one side to the other. Another sort of bridges are built over a valley, to join two mountains together. Of this kind there is one mentioned by travellers, called *pons volans*, which is reckoned to be 400 cubits in length, and 500 in height. Another still more stupendous is to be seen in the province of Shen-si. It was built over several high hills, and employed 100,000 men. To erect this bridge, some of the hills were levelled, and vast arches built between others, some of which were supported by pillars of a monstrous height and thickness, where the valley proved too wide.

²³
Triumphal
arches.

The Chinese are likewise very fond of triumphal arches. There are to be seen in great numbers, not only in all their cities, but on the mountains and eminences along the roads. They were originally erected in memory of their heroes, or persons who had signalized themselves by services done the state; but some of them are also erected to the memories of noble and illustrious women. The ornamental part of their ancient triumphal arches is so curiously wrought, the festoons and flowers so neatly cut, and the birds and other animals carved in such lively attitudes, that Father Le Comte looked upon them as Chinese master-pieces of that kind. These ornaments are so wonderfully detached from one another, that they seem to be only joined to, or run into, each other by small cordons, without the least confusion. This sufficiently shews the superior skill of their ancient workmen; for in those of later date the sculpture is sparing, looks coarse and heavy, and is without any piercing, or variety to enliven it. Except this neatness in the carving, however, neither the ancient nor modern architecture of the Chinese can be compared with the European, either with regard to the proportion, or the disposition of its parts. They have neither cornices nor capitals; and that which bears some resemblance to our friizes, is of such a height, that it rather shocks the eye that is unaccustomed to it; tho' it is so much the more agreeable to the Chinese taste, as affording more space for ornaments.

²⁴
American
architect-
ure.

Among the Americans, as may be naturally imagined, architecture was in a much lower state than either among the ancient Egyptians, or perhaps any other nation whatever. The Peruvians, who were the most civilized nation in America, had indeed attained to the art of polishing stones and fitting them to one another; but they were entirely ignorant of the use of cement, and were equally destitute of contrivance in their buildings. Their temples were often of a vast extent. That of Pachacamac, together with a palace of the Inca, and a fortress, were so connected together, as to form a structure half a league in circuit. Being unacquainted, however, with the use of the pulley, they were unable to raise the large stones, employed in build-

ing it, to any considerable height, and consequently the walls of all their edifices were low. Those of the temple of Pachacamac rose only twelve feet from the ground. They were indeed built with so much nicety, that the seams could hardly be discerned; but the apartments, as far as they can be traced in the ruins, were ill disposed, and afforded little accommodation. There was not a single window in any part of the building; and as no light could enter but by the door, the greatest part of the building must either have been totally dark, or artificially illuminated.

In the kingdom of Mexico, many magnificent cities and temples are said to have been found by the Spaniards; but, as not the least vestiges of any such buildings are now to be seen, it may justly be questioned whether they ever had an existence. Nor do even the exaggerated descriptions of the Spanish writers, when they descend to particulars, tend to give us any high idea of their magnificence. As far as can be gathered from their obscure and inaccurate descriptions, the famous temple of Mexico was only a square mass of earth partly faced with stone. It was raised to such a height, that the ascent to it was by a stair-case of 114 steps. Its base extended 90 feet on each side; and at the top it terminated in a quadrangle of 30 feet square, where were placed a shrine of the Deity, and two altars on which the victims were sacrificed. All the other celebrated temples in the kingdom were formed exactly on the same model; from which we can entertain no very high idea of the progress of the Mexicans in architecture.

The Celtic architecture is still visible in some remains of ancient Druidic temples, &c. in some parts of Britain. It appears to have been still more barbarous than the American; the stones being not only put together without any cement, but without the least polish; although, like other nations, they endeavoured to shew their magnificence by the vast size of the stones whereof these rude structures were composed. Of this there is a remarkable instance in the ruin called *Stonehenge**, near Salisbury in England. This, by Dr Stukeley, is reckoned to be the remains of the chief Druidic temple in the island; and some of its stones are so big, that it would require above 140 oxen to draw them.

²⁵
Celtic.

* See the article *Stonehenge*.

Several circular buildings of stones placed upon one another without any cement are also to be seen in different parts of the Highlands of Scotland. A very extraordinary species of buildings, however, have lately been discovered in that country, in which the stones, instead of being cemented together with clay or lime, are melted together into a kind of half vitrified mass. What hath given occasion to such an extraordinary method of building, it is difficult to determine. It seems hard to suppose that our ancestors should have known how to vitrify walls, and at the same time remained ignorant of the use of every kind of cement; and if, on the other hand, they really were acquainted with cement, the total want of it in every one of their buildings is equally unaccountable. Be this as it will, the fact is now certainly established, and an account has been published by Mr Williams, mineral engineer, of several ruins in the Highlands, where "the walls have been vitrified, or run and compacted together, by the force of fire; and that so effectually, that the most of the stones have been melted down; and any part of
the

²⁶
Extraordi-
nary me-
thod of vi-
trifying
walls.

the stones not quite run to glass has been entirely enveloped by the vitrified matter; and in some places the vitrification has been so complete, that the ruins now appear like vast masses or fragments of coarse glass or flags."

In what age this unparallelled method of building was in use, we can by no means determine, as not only history, but even fable of every kind, is silent about it. Nay, so little has such a contrivance been dreamed of by the moderns, that Mr Pennant, and others, who have observed these vitrified ruins in Scotland, took them for the lava's of ancient burning mountains.

These vitrified walls, notwithstanding the apparent difficulty of erecting them, seem by no means to have been deficient in height: for Mr Williams mentions one, the remains of which are still 12 feet perpendicular, from which it may be supposed to have been originally much higher; though even this is a vast height, considering the materials. Concerning their construction Mr Williams has the following conjecture.

"I imagine, (says he), they have raised two parallel dykes of earth or sods in the direction or course of their intended wall or building, and left a space between them just wide enough for the wall. I suppose these two parallel dykes, the groove, or mould in which they were to run their wall. This groove between the two dykes I suppose they packed full of fuel, on which they would lay a proper quantity of the materials to be vitrified. There is no doubt but a hot fire would melt down the stones, especially if they were of the plum-pudding kind, and not too large; and the frame of earth would keep the materials, when in fusion, from running without the breadth of their intended wall.

"This being the foundation, I suppose they have added new fires, and more materials, and raised their mould of earth by degrees, till they brought the whole to the intended height, and then have removed the earth from both sides the vitrified wall.

I am confident, from the appearance of the ruins, that the materials were run down by the fire in some

such method as this. In all the sections of the larger and smaller fragments of the vitrified ruins I have seen, I never saw the least appearance of a stone being laid in any particular way. I never saw a large stone in any fragment of these ruins; nor any stone, nor piece of a stone, that was not affected by the fire, and some part of it vitrified; and all the bits of stones that appear in these fragments, appear higgledy piggledy, just as we would suppose they would fall down in the fire when the materials were in a state of fusion.

"I have often seen lime-stone for land burnt in turf-kilns, which were nothing but two parallel dykes raised about six or seven feet high, and the ends built up as they filled in the stone and fuel.

"These answer very well in moderate weather; but in a high wind, I have seen the lime-stone vitrified to that degree, that it would cost the farmers much labour to dig out the vitrified matter, and they would have but very little time for their pains; yet the turf-kiln would stand it so well, that they would burn more than once in the same kiln.

"This I give as an example that they might run their vitrified wall in a groove between two turf-walls.

"A gentleman in Edinburgh, of great knowledge and veracity, told me, that his father had a brick-kiln built on the edge of a pretty steep bank; and that, while the kiln was burning, a high wind one night increased the heat to such a degree, that in the morning great part of the kiln was vitrified, which ran in a lava a considerable way down the hill."

These vitrified ruins are generally found on the tops of small hills, and have always the remains of some dry stone inclosures on the south side of them, which are by our author thought to have been places where their cattle were confined, and kept out of the reach of their enemies.—As to any other species of architecture in Britain, we know of none but what was introduced by the Romans, and, after being almost entirely lost, was considerably improved by the Normans, and still more, on the revival of the polite arts in the 15th and 16th centuries, as already observed.

PART I. PRINCIPLES OF ARCHITECTURE.

MANY ages must have elapsed before architecture came to be considered as a fine art. Utility was its original destination, and still continues to be its principal end. Experience, however, has taught us, that architecture is capable of exciting a variety of agreeable feelings. Of these, utility, grandeur, regularity, order, and proportion, are the chief.

Architecture being as useful as well as a fine art, leads us to distinguish buildings, and parts of buildings, into three kinds, *viz.* what are intended for use solely, what for ornament solely, and what for both. Buildings intended for utility solely, ought in every part to correspond precisely to that intention: the least deviation from use, though contributing to ornament, will be disagreeable; for every work of use being considered as a mean to an end, its perfection as a mean is the capital circumstance, and every other beauty in opposition is neglected as improper. On the other hand, in such things as are intended solely for ornament, as co-

lumnus, obelisks, triumphal arches, &c. beauty alone ought to be regarded. The principal difficulty in architecture lies in combining use and ornament. In order to accomplish these ends, different and even opposite means must be employed; which is the reason why they are so seldom united in perfection; and hence, in buildings of this kind, the only practicable method is, to prefer utility to ornament according to the character of the building: in palaces, and such buildings as admit of a variety of useful contrivance, regularity ought to be preferred; but in dwelling-houses that are too small for variety of contrivance, utility ought to prevail, neglecting regularity as far as it stands in opposition to convenience.

In considering attentively the beauty of visible objects, we discover two kinds. The first may be termed *intrinsic* beauty, because it is discovered in a single object, without relation to any other. The second may be termed *relative* beauty, being founded on a combina-

27
Conjecture
concerning
them.

48
Distinction
of buildings

29
Intrinsic
and relative
beauty.

Principles. tion of relative objects. Architecture admits of both kinds. We shall first give a few examples of *relative* beauty.

The proportions of a door are determined by the use to which it is destined. The door of a dwelling-house, which ought to correspond to the human size, is confined to seven or eight feet in height, and three or four in breadth. The proportions proper for a stable or coach-house are different. The door of a church ought to be wide, in order to afford an easy passage for a multitude; and its height must be regulated by its wideness, that the proportion may please the eye. The size of the windows ought always to be proportioned to that of the room they are destined to illuminate; for if the apertures be not large enough to convey light to every corner, the room must be unequally lighted, which is a great deformity. Steps of stairs should likewise be accommodated to the human figure, without regarding any other proportion; they are accordingly the same in large and in small buildings, because both are inhabited by men of the same size.

We shall next consider *intrinsic* beauty, blended with that which is *relative*. A cube itself is more agreeable than a parallelepipedon; this constantly holds in small figures: but a large building in the form of a cube is lumpish and heavy; while a parallelepipedon, set on its smaller base, is more agreeable on account of its elevation: Hence the beauty of Gothic towers. But if this figure were to be used in a dwelling-house, to make way for relative beauty, we would immediately perceive that utility ought chiefly to be regarded; and this figure, inconvenient by its height, ought to be set on its larger base: the loftiness in this case would be lost; but that loss will be more than sufficiently compensated by the additional convenience. Hence the form of buildings spread more upon the ground than raised in height, is always preferred for a dwelling-house.

³⁰ Internal divisions of houses. With regard to the internal divisions, utility requires that the rooms be rectangular, to avoid useless spaces. A hexagonal figure leaves no void spaces; but it determines the rooms to be all of one size, which is both inconvenient and disagreeable for want of variety. Though a cube be the most agreeable figure, and may answer for a room of a moderate size; yet, in a very large room, utility requires a different figure. Unconfined motion is the chief convenience of a great room; to obtain this, the greatest length that can be had is necessary. But a square room of large size is inconvenient. It removes chairs, tables, &c. at too great a distance from the hand, which, when unemployed, must be ranged along the sides of the room. Utility therefore requires a large room to be a parallelogram. This figure is likewise best calculated for the admission of light; because, to avoid cross-lights, all the windows ought to be in one wall; and if the opposite wall be at such a distance as not to be fully lighted, the room must be obscure. The height of a room exceeding nine or ten feet has little relation to utility; therefore proportion is the only rule for determining the height, when above that number of feet.

³¹ Utility and beauty often incompatible. Artists who deal in the beautiful, love to entertain the eye; palaces and sumptuous buildings, in which intrinsic beauty may be fully displayed, give them an opportunity of exerting their taste. But such a propen-

sity is peculiarly unhappy with regard to private dwelling-houses; because, in these, relative beauty cannot be displayed to perfection, without hurting intrinsic beauty. There is no opportunity for great variety of form in a small house; and in edifices of this kind, internal convenience has not hitherto been happily adjusted to external regularity. Perhaps an accurate coincidence in this respect is beyond the reach of art. Architects, however, constantly split upon this rock; for they never can be persuaded to give over attempting to reconcile these two incompatibles: how otherwise should it happen, that of the endless variety of private dwelling-houses, there should not be one found that is generally agreed upon as a good pattern? the unwearied propensity to make a house regular as well as convenient obliges the architect, in some articles, to sacrifice convenience to regularity; and, in others, regularity to convenience; and accordingly the house which turns out neither regular nor convenient, never fails to displease.

Nothing can be more evident, than that the form of a dwelling-house ought to be suited to the climate; yet no error is more common than to copy in Britain the form of Italian houses, not forgetting even those parts that are purposely contrived for collecting air, and for excluding the sun: witness our colonnades and loggias, designed by the Italians to gather cool air, and exclude the beams of the sun, conveniences which the climate of this country does not require.

We shall next view architecture as one of the fine arts; which will lead us to the examination of such buildings, and parts of buildings, as are calculated solely to please the eye. Variety prevails in the works of nature; but art requires to be guided by rule and compass. Hence it is, that in such works of art as imitate nature, the great art is, to hide every appearance of art; which is done by avoiding regularity, and indulging variety. But in works of art that are original and not imitative, such as architecture, strict regularity and uniformity ought to be studied, so far as consistent with utility.

Proportion is not less agreeable than regularity and uniformity; and therefore, in buildings intended to please the eye, they are all equally essential. It is taken for granted by many writers, that in all the parts of a building there are certain strict proportions which please the eye, in the same manner as in found there are certain strict proportions which please the ear; and that, in both, the slightest deviation is equally disagreeable. Others seem to relish more a comparison between proportion in numbers, and proportion in quantity; and maintain, that the same proportions are agreeable in both. The proportions, for example, of the numbers 16, 24, and 36, are agreeable; and so, say they, are the proportions of a room, whose height is 16 feet, the breadth 24, and the length 36. But it ought to be considered, that there is no resemblance or relation between the objects of different senses. What pleases the ear in harmony, is not the proportion of the strings of the instrument, but of the sound which these strings produce. In architecture, on the contrary, it is the proportion of different quantities that pleases the eye, without the least relation to sound. The same thing may be said of numbers. Quantity is a real quality of every body; number is not a real quality, but merely an idea that arises upon viewing a plurality of things in succession.

³² Architecture considered as a fine art.

³³ Difference between proportion of number and quantity.

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sion. An arithmetical proportion is agreeable in numbers; but have we from this any reason to conclude, that it must also be agreeable in quantity? At this rate, a geometrical proportion, and many others, ought also to be agreeable in both. A certain proportion may coincide in quantity and numbers; and amongst an endless variety of proportions, it would be wonderful if there never should be a coincidence. One example is given of this coincidence in the numbers 16, 24, and 36; but, to be convinced that it is merely accidental, we need but reflect, that the same proportions are not applicable to the external figure of a house, and far less to a column.

It is ludicrous to observe writers acknowledging the necessity of accurate proportions, and yet differing widely about them. Laying aside reasoning and philosophy, one fact universally agreed on ought to have undeceived them, that the same proportions which please in a model are not agreeable in a large building: a room 48 feet in length, and 24 in breadth and height, is well proportioned: but a room 12 feet wide and high, and 24 long, approaches to a gallery.

34
Beauty arising from proportion.

Perrault, in his comparison of the ancients and moderns, goes to the opposite extreme; maintaining, that the different proportions assigned to each order of columns are arbitrary, and that the beauty of these proportions is entirely the effect of custom. But he should have considered, that if these proportions had not originally been agreeable, they could never have been established by custom.

For illustrating this point, we shall add a few examples of the agreeableness of different proportions. In a sumptuous edifice, the capital rooms ought to be large, otherwise they will not be proportioned to the size of the building; for the same reason, a very large room is improper in a small house. But in things thus related, the mind requires not a precise or single proportion, rejecting all others; on the contrary, many different proportions are equally agreeable. It is only when a proportion becomes loose and distant, that the agreeableness abates, and at last vanishes. Accordingly, in buildings, rooms of different proportions are found to be equally agreeable, even where the proportion is not influenced by utility. With regard to the proportion the height of a room should bear to the length and breadth, it must be extremely arbitrary, considering the uncertainty of the eye as to the height of a room when it exceeds 16 or 17 feet. In columns, again, every architect must confess that the proportion of height and thickness varies betwixt 8 diameters and 10, and that every proportion between these two extremes is agreeable. Besides, there must certainly be a further variation of proportion, depending on the size of the column. A row of columns 10 feet high, and a row twice that height, requires different proportions: The intercolumniations must also differ in proportion according to the height of the row.

Proportion of parts is not only itself a beauty, but is inseparably connected with a beauty of the highest relish, that of concord and harmony: which will be plain from what follows: A room, the parts of which are all finely adjusted to each other, strikes us not only with the beauty of proportion, but with a pleasure far superior. The length, the breadth, the height, the windows, raise each of them a separate emotion: These emotions

are similar; and, though faint when separately felt, they produce in conjunction the emotion of concord or harmony, which is very pleasant. On the other hand, where the length of a room far exceeds the breadth, the mind, comparing together parts so intimately connected, immediately perceives a disagreement or disproportion which disgusts. Hence a long gallery, however convenient for exercise, is not an agreeable figure of a room.

In buildings destined chiefly or solely to please the eye, regularity and proportion are essentially necessary, because they are the means of producing intrinsic beauty. But a skilful artist will not confine his view to regularity and proportion; he will also study congruity, which is perceived when the form and ornaments of a structure are suited to the purpose for which it is appointed. Hence every building ought to have an expression suited to its destination. A palace ought to be sumptuous and grand; a private dwelling, neat and modest; a play-house, gay and splendid; and a monument, gloomy and melancholy. A heathen temple has a double destination: It is considered as a house dedicated to some divinity; therefore it ought to be grand, elevated, and magnificent: It is also considered as a place of worship; and therefore ought to be somewhat dark and gloomy, because dimness or obscurity produces that tone of mind which is favourable to humility and devotion. Columns, besides their chief destination of being supports, contribute to that peculiar expression which the destination of a building requires. Columns of different proportions serve to express softness, lightness, &c. as well as strength. Situation may also contribute to expression: Convenience regulates the situation of a private dwelling-house; and the situation of a palace ought to be lofty. This leads to a question, Whether the situation, where there happens to be no choice, ought, in any measure, to regulate the form of the edifice? The connection between a great house and a neighbouring field, though not extremely intimate, demands however some congruity. It would, for example, displease us to find an elegant building thrown away upon a wild uncultivated country: congruity requires a polished field for such a building. The old Gothic form of building was well suited to the rough uncultivated regions where it was invented; but was very ill adapted to the fine plains of France and Italy.

The external structure of a house leads naturally to its internal structure. A large and spacious room, which is the first that commonly receives us, is a bad contrivance in several respects. In the first place, when immediately from the open air we step into such a room, its size in appearance is diminished by contrast; it looks little, compared with the great canopy of the sky. In the next place, when it recovers its grandeur, as it soon doth, it gives a diminutive appearance to the rest of the house; passing from it, every apartment looks little. In the third place, by its situation it serves only for a waiting-room, and a passage to the principal apartments. Rejecting therefore this form, a hint may be taken from the climax in writing for another that appears more suitable: A handsome portico, proportioned to the size and fashion of the front, leads into a waiting-room of a larger size, and this to the great room, all by a progression of small

Principles.

35
Form of structures to be suited to the purposes for which they are intended.

36
Internal division of houses.

Principles. to great.

Grandeur is the principal emotion that architecture is capable of raising in the mind: it might therefore be the chief study of the artist, in great buildings destined to please the eye. But as grandeur depends partly on size, it is unlucky for architecture that it is governed by regularity and proportion, which never deceive the eye by making objects appear larger than they are in reality. But though regularity and proportion contribute nothing to grandeur, so far as that emotion depends on size; yet they contribute greatly to it by confining the figure within such bounds that it can be taken in and examined at one view; for when objects are so large as not to be comprehended but in parts, they tend rather to distract than satisfy the mind.

We shall next pass to such ornaments as contribute to give buildings a peculiar expression. It has been doubted, whether a building can regularly admit any ornament but what is useful, or at least has that appearance. But, considering the double aim of architecture as a fine, as well as an useful art, there is no reason why ornaments may not be added to please the eye, without any relation to utility. A private dwelling-house, it is true, and other edifices, where use is the chief aim, admit not regularly any ornament but what has at least the appearance of use: but temples, triumphal arches, and other buildings intended chiefly or solely for show, may be highly ornamented.

37
Different
kinds of or-
naments.

This suggests a division of ornaments into three kinds, viz. 1. Ornaments that are beautiful without relation to use; such as statues, vases, basso or alto relievo: 2. Things in themselves not beautiful, but possessing the beauty of utility, by imposing on the spectator, and appearing to be useful; such as blind windows: 3. Where things are beautiful in themselves, and at the same time take on the appearance of use; such as pilasters.

With regard to the *first*, we naturally require that a statue be so placed, as to be seen in every direction, and examined at different distances. Statues, therefore, are properly introduced to adorn the great stair that leads to the principal door of a palace, or to lessen the void between pillars. But a niche in the external front is an improper place for a statue. There is an additional reason against placing them upon the roof or top of the walls: their ticklish situation gives pain, as they have the appearance of being in danger of tumbling down; besides, we are inclined to feel from their being too much exposed to the inclemencies of the weather. To adorn the top of the wall with a row of vases, is an unhappy conceit, by placing a thing, whose natural destination is utility, where it cannot have even the appearance of use. As to carvings upon the external surface of a building, termed *basso relievo* when flat, and *alto relievo* when prominent, all contradictory expressions ought to be avoided. Now, firmness and solidity being the proper expressions of a pedestal, and, on the contrary, lightness and delicacy of carved work, the pedestal, whether of a column or of a statue, ought to be sparingly ornamented. The ancients never ventured any bolder ornament than the *basso relievo*.

With respect to ornaments of the *second* kind, it is

a great blunder to contrive them so as to make them appear useless. A blind window, therefore, when necessary for regularity, ought to be so disguised as to appear a real window: when it appears without disguise, it is disgusting, as a vain attempt to supply the want of invention; it shows the irregularity in a stronger light, by signifying that a window ought to be there in point of regularity, but that the architect had not skill sufficient to connect external regularity with internal convenience.

As to the *third*, it is an error to sink pilasters so far into the wall, as to remove totally, or mostly, the appearance of use. They should always project so much from the wall, as to have the appearance of supporting the entablature over them.

From ornaments in general, we descend to a pillar, Columns. the chief ornament in great buildings. The definition of a pillar is to support, really, or in appearance, another part termed the *entablature*. With regard to the form of a pillar, it must be observed, that a circle is a more agreeable figure than a square, a globe than a cube, and a cylinder than a parallelopipedon. This last, in the language of architecture, is saying, that a column is a more agreeable figure than a pilaster; and for that reason it ought to be preferred, when all other circumstances are equal. Another reason concurs, that a column annexed to a wall, which is a plain surface, makes a greater variety than a pilaster. Besides, pilasters at a distance are apt to be mistaken for pillars; and the spectator is disappointed, when, on a nearer approach, he discovers them to be only pilasters.

As to the parts of a column, a bare uniform cylinder, without a capital, appears naked; and without a base, appears too ticklishly placed to stand firm: it ought therefore to have some finishing at the top and bottom: Hence the three chief parts of a column, the shaft, the base, and the capital. Nature undoubtedly requires proportion among these parts, but it admits of variety of proportion. Vitruvius and some of the elder writers seem to think, that the proportions of columns were derived from the human figure, the capital representing the head, the base the feet, and the shaft the body. The Tuscan has been accordingly denominated the *Gigantic*; the Doric, the *Herculean*; the Ionic, the *Matronal*; and the Corinthian, the *Virginal*;—the Composite is a mixture of the Corinthian and Ionic. As to the base, the principle of utility interposes to vary it from the human figure, and to proportion it so to the whole, as to give the column the appearance of stability.

Among the Greeks, we find only three orders of columns, the Doric, the Ionic, and the Corinthian, distinguished from each other by their destination as well as by their ornaments. It has been disputed, whether any new order can be added to these: some hold the affirmative, and give for instances the Tuscan and Composite; others maintain, that these properly are not distinct orders, but only the original orders with some slight variation. The only circumstances that can serve to distinguish one order from another, are the form of the column, and its destination. To make the first a distinguishing mark, without regard to the other, would multiply orders without end. Destination is more limited, and it leads us to distinguish three kinds of orders; one plain and strong, for the purpose of sup-

Principles.

38
Columns.

39
Whether
new orders
can be in-
vented.

^{Principles.} supporting plain and massy buildings; one delicate and graceful, for supporting buildings of that character; and between these, a third, supporting buildings of a mixed nature. So that, if definition alone is to be regarded, the Tuscan is of the same order with the Doric, and the Composite with the Corinthian.

The ornaments of these three orders ought to be suited to the purposes for which they are intended. Plain and rustic ornaments would not be a little discordant with the elegance of the Corinthian order, and sweet and delicate ornaments not less with the strength of the Doric.

⁵⁰ Rules re-
garding
building in
general.
With respect to buildings of every kind, one rule, dictated by utility, is, that they be firm and stable. Another, dictated by beauty, is, that they also appear so to the eye: for every thing that appears tottering, and in hazard of tumbling down, produceth in the spectator the painful emotion of fear, instead of the pleasing emotion of beauty; and accordingly it should be the great care of the artist, that every part of his edifice appear to be well supported. Some have introduced a kind of conceit in architecture, by giving parts of buildings the appearance of falling; of this kind is the church of St Sophia in Constantinople; the round towers in the uppermost stories of Gothic buildings is in the same false taste.

The most considerable ornaments used in architecture are the five orders of columns, pediments, arches, balusters, &c. of which in the following chapters.

CHAP. I. Of the Orders of Architecture.

AN ORDER consists of two principal members, the COLUMN and the ENTABLATURE; each of which is composed of three principal parts. Those of the Column are, the *Base*, the *Shaft*, and the *Capital*; and those of the Entablature are, the *Architrave*, the *Frieze*, and the *Cornice*. All these are subdivided into many lesser parts, whose number, form, and dimensions, characterise each order, and express the degree of strength, delicacy, richness, or simplicity peculiar to it.

⁵¹ Parts of an
order divided
into two
classes.
The parts that compose an order may be distributed into two different classes. In the *first* may be ranged all that have any analogy to the primitive huts, and represent some part that was necessary in their construction. Such are the shaft of the column, with the plinth of its base, and the abacus of its capital; likewise the architrave and triglyphs, the mutules, modillions, or dentils, which all of them represent the rafters, or some other pieces of timber used to support the covering; and the corona, representing the beds of materials that composed the covering. All these may properly be distinguished by the name of *essential members*. The subservient parts, contrived for the use or ornaments of the former, and commonly called *mouldings*, may constitute the *second* class.

There are eight regular mouldings in ornamenting columns: the fillet, lisel, or square; the astragal, or bead; the torus, or tore; the scotia, mouth, or casement; the echinus, ovolo, or quarter-round; the inverted cyma, talon, or ogee; the cyma, cyma recta, or cymatium; the cavetto, or hollow. The names of these allude to their forms, and their forms are adapted to the purposes for which they are intended. See Plate XXIX.

The ovolo and talon, as they are strong at the ex-

trimities, are fit for supports; the cyma and cavetto, though improper for supports, serve for coverings to shelter other members; the torus and astragal, being shaped like ropes, are intended to bind and fortify the parts with which they are connected: But the use of the scotia and fillet is only to separate and distinguish the other mouldings, to give a graceful turn to the profile, and to prevent the confusion which would arise from joining several curved members together.

There are various methods of describing the contours of mouldings; but the simplest and best is to form them of quadrants of circles.

An assemblage of what are called essential parts and mouldings is termed a *profile*. The most perfect profiles are such as are composed of few mouldings, varied in form and size; and so disposed, that the straight and curved ones succeed each other alternately. When ornaments are employed in mouldings, some of them should be left plain, in order to give a proper repose: For, when all are ornamented, the figure of the profile is lost.

⁴² Profile,
what.
Columns, in imitation of trees, from which they drew their origin, are tapered in their shafts. In the antiques the diminution is variously performed; beginning sometimes from the foot of the shaft, and at others from one quarter, or one third of its height; the lower part being perfectly cylindrical. The former of these was most in use amongst the ancients, and, being the most natural and graceful, ought to have the preference, though the latter hath been more universally practised by modern artists.

The first architects, says Mr Auzoult, probably made their columns in straight lines, in imitation of trees; so that their shaft was a frustum of a cone: but finding this form abrupt and disagreeable, they made use of some curve, which, springing from the extremities of the superior and inferior diameters of the column, swelled beyond the sides of the cone, and by that means gave a more pleasing figure to the contour.

Vitruvius, in the second chapter of his third book, mentions this practice, but in so obscure and cursory a manner, that his meaning hath not been understood; and several of the modern architects, intending to conform themselves to his doctrine, have made the diameters of their columns greater in the middle than at the foot of the shaft. Leon Baptista, Alberti, and others of the Florentine and Roman architects, have carried this to a very great excess; for which they have been justly blamed, as it is neither natural, reasonable, nor beautiful.

Monfieur Auzoult observes, that a column, supposing its shafts to be the frustum of a cone, may have an additional thickness in the middle, without being swelled there beyond the bulk of its inferior parts; and supposes the addition mentioned by Vitruvius to signify nothing but the increase towards the middle of the column, occasioned by changing the straight line, which at first was in use, for a curve.

This supposition is extremely just, and founded on what is observed in the works of antiquity; where there is no instance of columns thicker in the middle than at the bottom, though all have the swelling hinted at by Vitruvius, all of them being terminated by curves; some granite columns excepted, which are bounded by straight lines; a proof, perhaps, of their

^{Principles.}

⁴¹ Diminution
of columns.

Principles.

antiquity, or of their having been wrought in the quarries of Egypt by bungling and unskilful workmen.

Monsieur Blondel, in his book entitled *Resolution des quatre principaux problèmes d'Architecture*, teaches various manners of diminishing columns; the best and simplest of which is by means of the instrument which Nicomedes invented to describe the first conchoid: for this, being applied at the bottom of the shaft, performs at one sweep both the swelling and the diminution; giving such a graceful form to the column, that it is universally allowed to be the most perfect practice hitherto discovered. The columns in the Pantheon, accounted the most beautiful among the antiques, are made in this manner; as appears by the exact measures of one of them to be found in Desgodet's antiques of Rome.

44
Vignola's
method.

To give an accurate idea of the operation, it will be necessary first to describe Vignola's method of diminution, on which it is grounded. "As to this second method, says Vignola, it is a discovery of my own; and although it be less known than the former, it will be easily comprehended by the figure. Having therefore determined the measures of your column, (that is to say, the height of the shaft, and its inferior and superior diameters), draw a line indefinitely from C (B), through D, perpendicular to the axis of the column; this done, set off the distance C D, which is the inferior semi-diameter, from A, the extreme point of the superior semi-diameter, to B, a point in the axis; then from A, through B, draw the line A B E, which will cut the indefinite line C D in E; and, from this point of intersection E, draw thro' the axis of the column any number of rays as E B a, on each of which, from the axis towards the circumference, setting off the interval C D, you may find any number of points, a, a, a, through which if a curve be drawn, it will describe the swelling and diminution of the column."

45
Nicomede's in-
strument.

Though this method be sufficiently accurate for practice, especially if a considerable number of points be found, yet, strictly speaking, it is defective; as the curve must either be drawn by hand, or by applying a flexible ruler to all the points; both of which are liable to variations. Blondel therefore, to obviate this objection, (after having proved the curve passing from A to C through the points a, a, to be of the same nature with the first conchoid of the ancients), employed the instrument of Nicomedes to describe it; the construction of which is as follows:

Having determined, as above, the length of the shaft, with the inferior and superior diameters of the column, and having likewise found the length of the line C D E, take three rulers, either of wood or metal, as F G, I D, and A H; of which let F G and I D be fastened together at right angles in G. Cut a dove-tail groove in the middle of F G, from top to bottom; and at the point E on the ruler I D (whose distance, from the middle of the groove in F G, is the same as that of the point of intersection from the axis of the column) fix a pin; then on the ruler A H set off the distance A B, equal to C D the inferior semi-diameter of the column, and at the point B fix a button, whose head must be exactly fitted to the groove made in F G, in which it is to slide; and, at the other extremity of the ruler A H, cut a slit or canal from H to K, whose length must not be less than the diffe-

rence of length between E B and E D, and whose breadth must be sufficient to admit the pin fixed at E, which must pass through the slit, that the ruler may slide thereon.

The instrument being thus completed, if the middle of the groove, in the ruler F G, be placed exactly over the axis of the column, it is evident that the ruler A H, in moving along the groove, will with the extremity A describe the curve A a C; which curve is the same as that produced by Vignola's method of diminution, supposing it done with the utmost accuracy: for the interval A B, a b, is always the same; and the point E is the origin of an infinity of lines, of which the parts B A, b a, b a, extending from the axis to the circumference, are equal to each other and to D C. And if the rulers be of an indefinite size, and the pins at E and B be made to move along their respective rulers, so that the intervals A B and D E may be augmented or diminished at pleasure, it is likewise evident that the same instrument may be thus applied to columns of any size.

In the remains of antiquity the quantity of the diminution is various; but seldom less than one eighth of the inferior diameter of the column, nor more than one sixth of it. The last of these is by Vitruvius esteemed the most perfect.

46
Quantity of
diminution.

Of the TUSCAN Order.

47

This is the most solid and simple of all the orders. It is composed of few parts, devoid of ornaments, and so massy, that it seems capable of supporting the heaviest burden. There are no remains of a regular Tuscan order among the antiques: the doctrine of Vitruvius concerning it is obscure; and the profiles of Palladio, Scamozzi, Serlio, de l'Orme, and Vignola, are all imperfect.

Plate XXVI

The height of the Tuscan column is 14 modules, or semi-diameters, each consisting of 30 minutes; and that of the whole entablature $3\frac{1}{2}$ modules; which being divided into 10 equal parts, three of them are for the height of the architrave, three for the frieze, and the remaining four for the cornice: The capital is one module; the base, including the lower cincture of the shaft, is likewise one module; and the shaft, with its upper cincture and astragal, 12 modules.

These are the general dimensions of the order; the particular dimensions may be learned by inspection of the plates.

In the remains of antiquity, the quantity of diminution at the top of the Tuscan column is various; but seldom less than one eighth, nor more than one sixth, of the inferior diameter of the column. The last of these is generally preferred; and Chalmers and others make the same diminution in all columns, without regard to their order.

Of the DORIC.

49

This order is next in strength to the Tuscan; and, being of a grave, robust, and masculine aspect, is by Scamozzi called the *Herculean*. As it is the most ancient of all the orders, it retains more of the structure of the primitive huts than any of the rest; the triglyphs in its frieze representing the ends of the joists, and the mutules in its cornice representing the rafters.

The height of the Doric column, including its capital

Fig. 2. The second sort of Huts

Plate XXV. (B).

Fig. 1. The first sort of Hubs

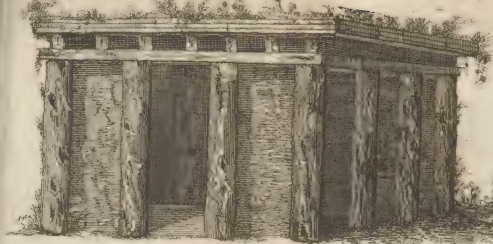
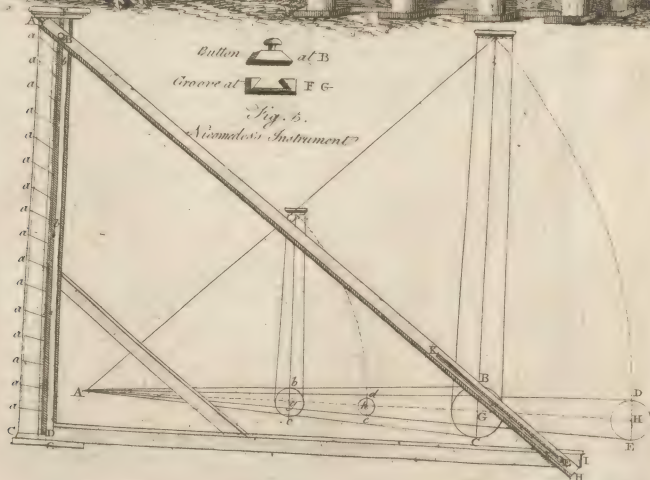
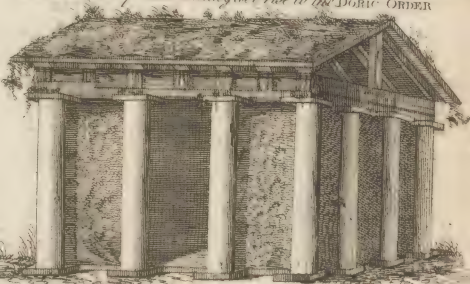


Fig. 4.
Origin of the Corinthian Order.



No. 3
The third sort of huts which gave rise to the DORIC ORDER



• Abell South ²



Boice
Faint

Height

12	35	
	85	
12 1/2	45	
21	105	
10'	7 1/4	
9	2	
8	7 1/4	
24	5 1/4	
18 1/2	3	
10	7 1/4	
11	6 1/4	
2 1/2	2 1/2	
	10	
2	3 1/4	
2 1/2	7 1/2	

• Height 42 •

• Height 31 •

• Height 11 1/4 •

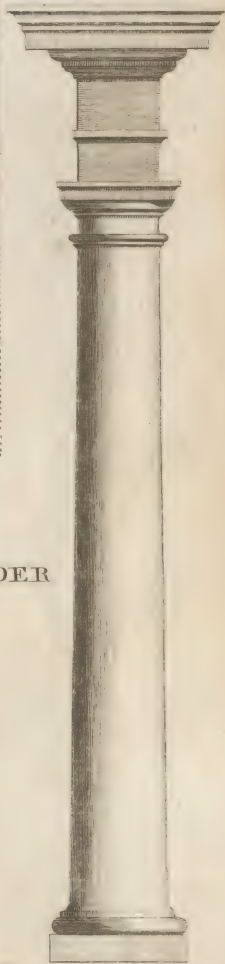
• Height 12 •

• Height 12 •

• Height 12 •

Whole height of the Corniciature is Height 45 1/2 Minutis

The
TUSCAN ORDER

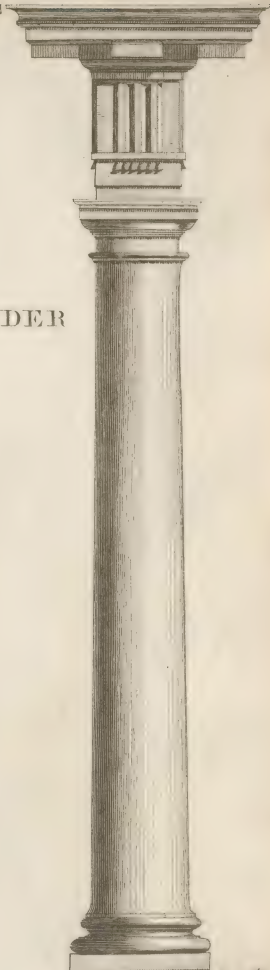
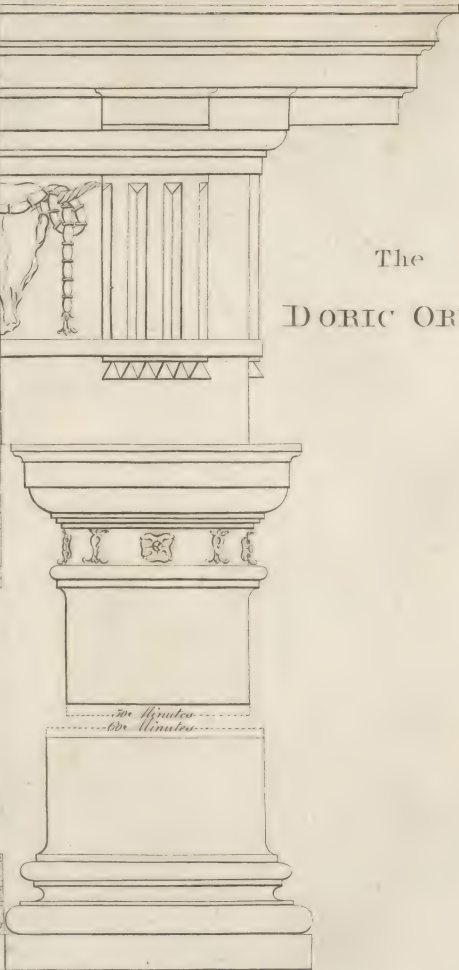


• A. Belli, Sculp. •



The
DORIC ORDER

Diameter	Height
32	24
20	7
18	24
14	24
12	8
10	7
8	12
6	12
4	12
3	12
2	12
1	12
32	32
20	7
18	24
14	24
12	8
10	7
8	12
6	12
4	12
3	12
2	12
1	12
32	32
20	7
18	24
14	24
12	8
10	7
8	12
6	12
4	12
3	12
2	12
1	12
32	32
20	7
18	24
14	24
12	8
10	7
8	12
6	12
4	12
3	12
2	12
1	12



W. Bell Sculp.





Fig. 1.
Siller Lost

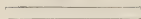


Fig. 2.
Isrugal

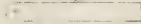


Fig. 3.
Torus

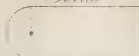


Fig. 4.
Satria Mouth

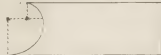


Fig. 5.
Ovolo

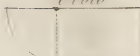


Fig. 6.
Cine

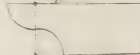


Fig. 7.
Cyma Recta

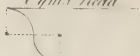


Fig. 8.
Cuvette



Fig. 9.
VOLUTE

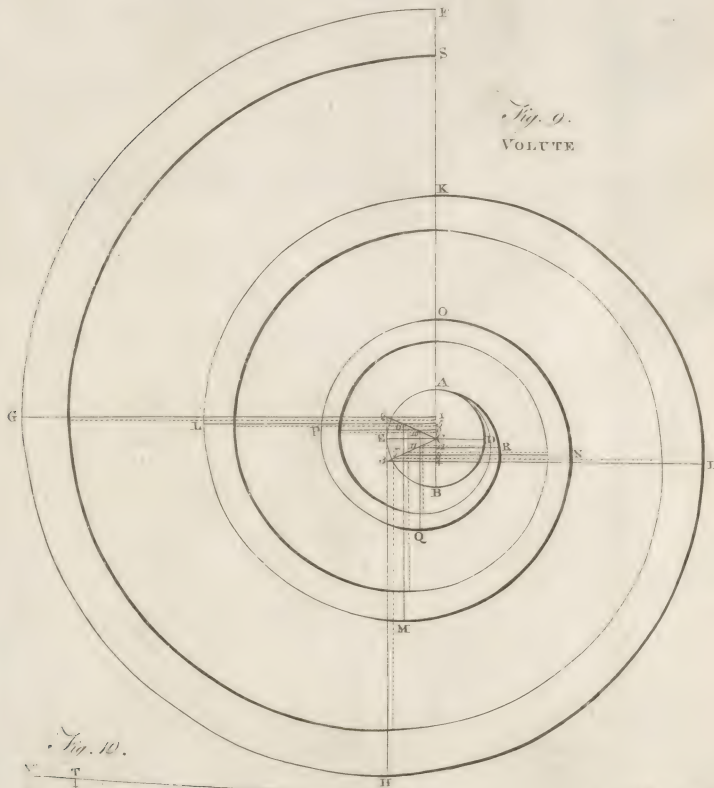
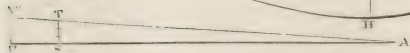


Fig. 10.



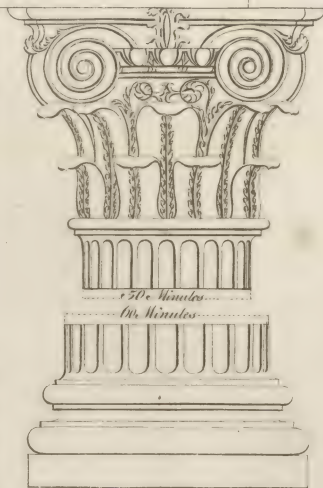
Well, help





The
COMPOSITE
ORDER

Height	Width
128	2
40 1/2	7 1/2
40 1/2	10 1/2
13	0
40 1/2	2 1/2
40 1/2	3 1/2
40 1/2	4 1/2
40 1/2	5 1/2
40 1/2	6 1/2
40 1/2	7 1/2
40 1/2	8 1/2
40 1/2	9 1/2
40 1/2	10 1/2
40 1/2	11 1/2
40 1/2	12 1/2
40 1/2	13 1/2
40 1/2	14 1/2
40 1/2	15 1/2
40 1/2	16 1/2
40 1/2	17 1/2
40 1/2	18 1/2
40 1/2	19 1/2
40 1/2	20 1/2
40 1/2	21 1/2
40 1/2	22 1/2
40 1/2	23 1/2
40 1/2	24 1/2
40 1/2	25 1/2
40 1/2	26 1/2
40 1/2	27 1/2
40 1/2	28 1/2
40 1/2	29 1/2
40 1/2	30 1/2
40 1/2	31 1/2
40 1/2	32 1/2
40 1/2	33 1/2
40 1/2	34 1/2
40 1/2	35 1/2
40 1/2	36 1/2
40 1/2	37 1/2
40 1/2	38 1/2
40 1/2	39 1/2
40 1/2	40 1/2



W. B. Smith, sculp.



Principles. pital and base, is 16 modules, and the height of the entablature four; the latter of which being divided into eight parts, two of them are for the architrave, three for the frieze, and three for the cornice.

In most of the antiques, the Doric column is executed without a base. Vitruvius likewise makes it without one; the base, according to him, having been first employed in the Ionic order, in imitation of the sandal of a woman's foot. Scamozzi blames this practice and most of the modern architects are of his opinion.

49
Ornaments
of the frieze.

In the profile of the theatre of Marcellus, the frieze is enriched with bulks and roses; the architrave consists only of one fascia and a fillet; the drops are conical; the metope is enriched with a bull's skull, adorned with a garland of beads, in imitation of those on the temple of Jupiter Tonans at the foot of the Capitol. In some antique fragments, and in a great many modern buildings, the metopes are alternately adorned with ox-skulls and pateras. But they may be filled with any other ornaments, according to the definition of the building.

50

The IONIC Order

Pl. XXVIII. Is of a more slender make than the Doric or Tuscan; its appearance is simple, yet graceful and majestic; its ornaments are few; so that it has been compared to a sedate matron, in decent, rather than magnificent, attire.

Among the ancients, the form of the Ionic profile appears to have been more positively determined than that of any other order; for, in all the antiques at Rome (the temple of Concord excepted), it is exactly the same.

The modern artists have likewise been unanimous in their opinions; all of them, excepting Palladio and his imitators, having employed the dentil, cornice, and the other parts of the profile, nearly as they are found in the Coliseum, the temple of Fortune, and the theatre of Marcellus.

The height of the Ionic column is 18 modules, and that of the entablature $\frac{4}{5}$, or one quarter of the height of the column, as in the other orders, which is a trifle less than in any of the antique Ionics. In all the antiques, the base is Attic; and the shaft of the column may either be plain, or fluted with 24 flutings, or 20 only, as in the temple of Fortune. The plan of the flutings may be a trifle more than a femicircle, as in the forum of Nerva, because they then appear more distinct. The fillets, or intervals between them, must not be broader than one third of the breadth of a fluting, nor narrower than one fourth. The ornaments of the capital must correspond with the flutings of the shaft; and there must be an oval above the middle of each fluting. The volutes ought to be traced according to Mr Goldman's method, which is as follows:

51
Method of
drawing vol-
utes.

Plate XXIX. fig. 9. Draw the cathetus F C, whose length must be 15 minutes, or one fourth of a module; and, from the point C, describe the eye of the volute A E B D, of which the diameter is to be 6 $\frac{1}{2}$ minutes; divide it into four equal sectors by the diameters A B, D E. Bisect the radii C A, C B, in 1 and 4; and on the line 1, 4, construct a square 1, 2, 3, 4. From the centre C, to the angles 2, 3, draw the diagonals C 2, C 3, and divide the side of the square 1, 4, into 6 equal parts, at 5, 9, C, 12, 8.

Then through the points 5, 9, 12, 8, draw the lines 5, 6, 9, 10, 12, 11, 8, 7, parallel to the diameter E D, which will cut the diagonals in 6, 7, 10, 11; and the points 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, will be the centres of the volute. From the first centre 1, with the distance 1 F, describe the quadrant F G; from the second centre 2, with the distance 2 G, describe the quadrant G H; and, continuing the same operation from all the 12 centres, the contour of the volute will be completed.

Fig. 10. The centres for describing the fillet are found in this manner. Construct a triangle, of which the side A F is equal to the part of the cathetus contained between A F and the side F V, equal to C 1; place the distance F S from F towards A, equal to F S the breadth of the fillet, and through the point S draw the line S T, which will be to C 1 in the same proportion as A S is to A F; place this line on the diameter of the eye A B; divide it into three equal parts; and, through the points of division, draw lines parallel to the diameter E D, which will cut the diagonals C 2, C 3, and you will have twelve new centres, from whence the interior contour of the fillet may be described, in the same manner as the exterior one was from the first centres.

Of the CORINTHIAN Order.

52

The proportions of this order are extremely delicate. Plate XXX. It is divided into a great variety of members, and enriched with a profusion of ornaments. Scamozzi calls it the *virginal order*; and indeed it has all the delicacy in its make, and all the delicacy in its dress, peculiar to young girls.

The most perfect model of the Corinthian order is generally allowed to be in the three columns in the Campidoglio at Rome, the remains, as it is thought, of the temple of Jupiter Stator.

The Corinthian column should be 20 modules high, and the entablature $\frac{5}{8}$; which proportions are a medium between those of the Pantheon and the three columns. The base of the column may be either Attic or Corinthian: They are both beautiful. If the entablature be enriched, the shaft may be fluted. The flutings may be filled, to one third of their height, with cablings, as in the inside of the Pantheon; which will strengthen the lower part of the column, and make it less liable to injury.

In most of the antiques at Rome, the capital of this order is enriched with olive-leaves; the acanthus being seldom employed but in the Composite. De Cordonio, however, prefers the acanthus.

The divisions of the entablature bear the same proportions to each other, as the Tuscan, Ionic, and Composite orders.

The COMPOSITE

53

Is, strictly speaking, only a species of the Corinthian; and therefore retains, in a great measure, the same character.

It does not appear that the ancients affected any particular form of entablature to this order. Sometimes the cornice is entirely plain, as in the temple of Bacchus; at others, as in the arch of Septimius Severus, it is enriched with dentils differing very little from the Ionic; and in the arch of Titus, there are both dentils

54
Different
kinds of or-
naments.

and

Principles. and modillions; the whole form of the profile being the same with the Corinthian, as executed in the antiques at Rome.

The modern architects have varied more in this than in any other order, each following the bent of his own fancy.

The height of the Composite column, and parts of the entablature, is the same with that of the Corinthian. The foot of the leaves of the capital ought not to project beyond the upper part of the shaft. The different bunches of leaves should be strongly marked; the sprigs which arise between the upper ones should be kept flat upon the vase; and the ornaments of the volutes must not project beyond the fillets that inclose them.

55

CHAP. II. Of Pilasters.

THESE differ from columns only in their plan; which is a square, as that of columns is round. Their bases, capitals, and entablatures, have the same parts, with the same heights and projections, as those of columns: they are also distinguished in the same manner, by the names of Tuscan, Doric, Ionic, Corinthian, and Composite.

The column is undoubtedly more perfect than the pilaster. However, they may be employed with great propriety on many occasions. Some authors declaim against pilasters, because, according to them, they do not admit of diminution. But this is a mistake; there are many instances, in the remains of antiquity, of their being diminished. Scamozzi always gave his pilasters the same diminution as his columns: Palladio and Inigo Jones have likewise diminished them in many of their buildings.

56
Pilasters
where used
full.

Pilasters are employed in churches, galleries, halls, and other interior decorations, to save room; and for, as they seldom project beyond the solid wall above one quarter of their diameter, they do not occupy near so much space as columns. They are likewise used in exterior decorations; sometimes alone, instead of columns, on account of their being less expensive; and sometimes they accompany columns, being placed behind them to support the architraves, where they enter the building, as in the Pantheon at Rome; or, in the same line with them, to fortify the angles, as in the portico of Septimius.

When pilasters are used alone, they should project one quarter of their diameter beyond the walls. When placed behind columns, especially if they be very near them, they need not project above one eighth of their diameter. But, when placed on a line with columns, their projection must be regulated by that of the columns; and consequently, it can never be less than a semidiameter, even when the columns are engaged as much as possible.

57
How ornamental.

The shafts of pilasters are frequently adorned with flutings, in the same manner as those of columns; the plan of which may be a trifle more than a semicircle: their number must be seven on each face, which makes them nearly of the same size with those of columns. The intervals, or fillets, must either be one third or one fourth of the fluting in breadth.

PI. XXXII. The capitals of pilasters are profiled nearly in the same manner as those of columns.

CHAP. III. Of Attics.

THESE very properly follow the pilasters; being nothing more than square pillars with their cornices. They had their origin in Athens, where it was for many ages a rule in building to conceal the roof. For this purpose, nothing served so well as a kind of low or little order ranged in a continued line, singly, or with the interruption of balusters; which rising above the rest of the work and before the roof, hid it perfectly, and placed something agreeable in view. The place of attics, therefore, is at the uppermost extremity of a building, to which they serve as a crown, or very properly make a finishing for the other orders when they have been used in the structure. They must never stand under any thing except such ornaments as are placed at the very top. These Attics should never exceed in height one third of the height of the order on which they are placed, nor be less than one quarter of it. The base, dye, and cornice, of which they are composed, may bear the same proportions to each other as those of pedestals do; and the base and cornice may be composed of the same mouldings as those of pedestals. Sometimes the Attic is continued throughout; at others, it projects, and forms a pilaster over each column of the order. The breadth of this pilaster is seldom made narrower than the upper diameter of the column below it, and never broader. Its projection may be equal to one quarter of its breadth.

58

CHAP. IV. Of Persians, Caryatides, and Termini.

59

BESIDES columns and pilasters, it is sometimes customary to employ representations of the human figure, to support entablatures in buildings. The male figures are called *Persians*; and the female, *Carians*, or *Caryatides*.

The *Persians* are so called from a victory gained over the Persians by Pausanias, who having brought home spoils and trophies to the Athenians, they fixed upon Persian figures for those which should support entablatures, and thus kept in mind that there were once Persian slaves in Athens. To represent these conquered people in the lowest state possible, they loaded them with the heaviest entablature, viz. that of the Doric order. In process of time, however, other figures besides those of Persians were introduced, and other entablatures put over them; but the name was still retained.

The proper Caryatides are women dressed in long robes, after the Asiatic manner; and the origin of the device was as follows.—The Carians had been long at war with the Athenians; but being at length totally vanquished, their wives were led away captives; and, to perpetuate the memory of this event, trophies were erected, in which figures of women dressed in the Caryatic manner, were used to support entablatures like the Persians; and though other female figures were afterwards used in the same manner, the name of *Caryatides* was always retained.

The ancients made frequent use of Persians and Caryatides, and delighted in diversifying them a thousand ways. The modern artists have followed their example; and there is a great variety of compositions of this kind to be met with in different parts of Europe.

Indecent attitudes, distorted features, and all monstrous

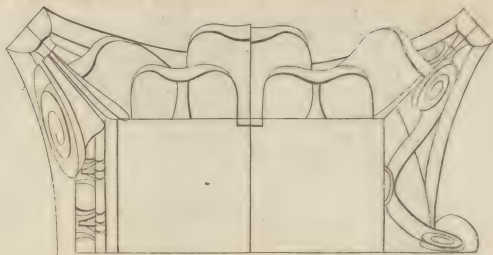
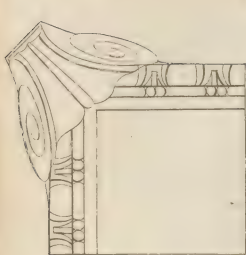
60
Origin of
Persians.

61
Of Caryatides.



PLANS of PILASTER CAPITALS

Plate XXXII.



PEDESTALS

Fusca

Loric

Tonic

Corinthian Comp.th

[illegible]

Principles.

Principles.

fruous productions, ought to be avoided, of which there are many examples in Gothic buildings. On the contrary, the attitudes should be simple and graceful, the countenance always pleasing, though varied and strongly marked agreeable to the nature of the object represented.

62
Their proportions, &c.

The Caryatides, or female figures, should never much exceed the human size. But the Persians, or male figures, may be of any size; and the larger the better, as they will strike the beholder with the greater awe and astonishment. Persians may be used with propriety in arsenals, galleries of armour, &c. under the figures of captives, heroic virtues, &c. Their entablature ought to be Doric, and bear the same proportion to them as to columns of the same height. The entablature for Caryatides ought to be either Ionic or Corinthian, according as the character of the figures is more or less delicate.

63
Termini.

Termini are sometimes employed, instead of Persians or Caryatides, to support the entablatures of monuments, chimney-pieces, and such like compositions. These figures owe their origin to the stones used by the ancients to mark the limits of particular possessions. Numa Pompilius, to render these inviolable, consecrated the terminus into a deity, and instituted festivals and sacrifices to his honour. In a short time, what was formerly only large upright stones, were represented in human shape; and afterwards introduced as ornaments to temples and other buildings. The termini are now principally used as ornaments for gardens and fields.

64

CHAP. V. Of Pedestals.

Most writers consider the *Pedestal* as a necessary part of the order, without which it is not complete. It is indeed a matter of little importance whether it be considered in that light, or as a distinct composition: we shall therefore treat of a pedestal as a distinct body, having no more connection with the order than an attic, a basement, or any other part with which it may on some occasions be afficiated.

A pedestal consists of three principal parts; the base, the dye, and the cornice. The dye is always nearly of the same figure; being constantly either a cube or a parallelopipedon: but the base and cornice are varied and adorned with more or fewer mouldings, according to the simplicity or richness of the composition in which the pedestal is employed. Hence pedestals are, like columns, distinguished by the names of *Tuscan*, *Doric*, *Ionic*, *Corinthian*, and *Composite*.

65
Pedestals where proper.

Some authors are averse to pedestals, and compare a column raised on a pedestal to a man mounted on stilts; imagining that they were introduced merely from necessity, and for want of columns of a sufficient length. It is indeed true, that the ancients often made use of artifices to lengthen their columns; as appears by some that are in the Baptistery of Constantine at Rome; the shafts of which, being too short for the building, were lengthened and joined to their bases by an undulated sweep, adorned with acanthus leaves. Nevertheless, there are many occasions where pedestals are evidently necessary; and some in which the order, were it not raised, would lose much of its beautiful appearance. Thus, in the insides of churches, if the columns that support the vault were placed immediately on the

ground, the seats would hide their bases and a good part of their shafts; and, in the theatres of the ancients, if the columns of the scene had been placed immediately on the stage, the actors would have hid a part of them from the audience. In interior decorations, a pedestal diminishes the parts of the order, which otherwise might perhaps appear too clumsy, and hath the advantage of placing the column in a more favourable view, by raising its base nearer the level of the spectator's eye. In a second order of arcades, there is no avoiding pedestals; as without them it is impossible to give the arches any tolerable proportion.

66
Their proportions.

With regard to the proportion that pedestals ought to bear to that of the columns they support, it is by no means fixed. Both the ancients and moderns vary greatly on this head. Vignola's proportions are generally reckoned the best. He makes his pedestals in all the orders of the same height, viz. one third of the column; and as their breadth of course increases or diminishes in the same degree as the diameters of their respective columns do, the character of the order is always preserved, which, according to any other method, is impossible.

As to the divisions of the pedestal; if the whole height be divided into nine parts, one of them may be given to the height of the cornice, two to the base, and the six remaining to the dye. The breadth of the dye is always made equal to that of the plinth of the column. The projection of the cornice may be made equal to its height; and the base being divided into three parts, two of them will be for the height of the plinth, and one for the mouldings, whose projection must be less than that of the cornice. These measures are common to all pedestals. See Plate XXXII.

CHAP. VI. Of Intercolumnations.

67

COLUMNS are either engaged, or insulated; and, when insulated, are either very near the wall, or at a considerable distance from it. Engaged columns, or such as are near the walls of a building, are not limited in their intercolumnations, as these depend on the breadths of the arches, windows, niches, or other decorations placed between the columns. But columns that are entirely detached, and perform alone the office of supporting the entablature, as in peristyles, porches, and galleries, must be near each other, for the sake both of real and apparent solidity.

The intercolumnations among the ancients were various. Those used in the Ionic and Corinthian orders were the pycnostyle, of which the interval was equal to one diameter and a half of the column; the systyle, whose interval was equal to two diameters; the eustyle, to two and a quarter; the diastyle to three, and the aræostyle to four. In the Doric order, they used other intercolumnations, regulating them by the triglyphs, one of which was always placed directly over the middle of each column; so that they were either systyle, monotriglyph, of one diameter and a half; diastyle, of two diameters and three quarters; or aræostyle, of four diameters; and the Tuscan intervals were very wide, some of them being above seven diameters, which was very practicable, as the architraves were of wood.

Among these different intercolumnations, the pycnostyle and systyle are too narrow; for although the

68
Different intercolumnations used by the ancients.

ancients

Principles.

ancients made frequent use of them, that ought rather to be ascribed to necessity than choice. For, as the architraves were composed of single stones, extending from the middle of one column to the middle of another, it would have been difficult, especially in large buildings, to find blocks of a sufficient length for diastyle intervals. With regard to the areostyle and Tuscan intercolumniations, they are by much too wide, and can only be used in rustic buildings, where the architraves are of wood; neither is the diastyle sufficiently solid in large compositions. The eustyle is a medium between the narrow and broad intervals; and, being at the same time both spacious and solid, hath been preferred to any of the rest by the ancients as well as the moderns.

69
Used by
Vignola.

Vignola observed nearly the same proportion in all his intercolumniations; which practice, though condemned by several writers, is certainly preferable to any other; as it preserves the character of each order, and maintains in all of them an equal degree of real solidity. Setting aside therefore the pycnostyle and systyle dispositions on account of their want of space, and the areostyle for its deficiency in point of strength, it may be established, that the diastyle and eustyle intercolumniations (the latter of which, on most occasions, ought to have the preference) may be employed in all the orders without distinction, excepting the Doric; in which the most perfect interval is ditriglyph; neither the monotriglyph, nor the areostyle, being to be suffered but in cases of necessity.

Sometimes, on account of the windows, doors, niches, and other decorations, which correspond with the intercolumniations of the peristyle, or gallery, it is not possible to make the intervals so narrow as eustyle, or even as diastyle: wherefore the moderns, authorized by some few examples of the ancients, where grouped columns are employed, have invented a manner of disposing them, called by Perrault *areostyle*, which admits of a larger interval, without any detriment to the apparent solidity of the building. This kind of disposition is composed of two systyle intercolumniations; the column that separates them being approached towards one of those at the extremities, sufficient room only being left between them for the projection of the capitals; so that the great space is three diameters and a half wide, and the little one half a diameter.

In peristyles, galleries, or porticos, all the intercolumniations must be equal; but in a logio, or porch, the middle interval may be broader than the others, by a triglyph or modillion, or three or four dentils; unless the columns at the angles be coupled, or grouped with pilasters; in which case, all the intervals should be of the same dimensions.

When buildings are very small, as is frequently the case in temples and other inventions used for ornamenting gardens, the intercolumniations may be broader, in proportion to the diameter of the columns, than usual; because, when they are nearer each other than three feet, there is hardly room for a bulky person to pass between them.

CHAP. VII. Of Arches.

ARCHES are not so magnificent as colonnades; but they are more solid and less expensive. They are pro-

per for triumphal entrances, gates of cities, of palaces, of gardens, and of parks, and in general for all openings that require an extraordinary breadth.

There are various manners of adorning arches. Sometimes their piers are rusticated; sometimes they are adorned with pilasters, termini, or caryatides; and sometimes they are made sufficiently broad to admit niches or windows. The circular part of the arch is either furrowed with rustic key-stones, or with an archivolt enriched with mouldings; which, in the middle, is sometimes interrupted by a console, a mask, serving at the same time as a key to the arch, and as a support to the architrave of the order. The archivolt is sometimes supported by an impost, at the head of the pier; and at others by columns placed on each side of it, with a regular entablature, or architrave and cornice. There are likewise instances of arcades without piers, the arches being turned on single columns, as in the temple of Faunus at Rome, &c. This practice, however, ought to be seldom imitated, as it is neither solid nor handsome.

When arches are large, the key-stone should never be omitted, but cut in the form of a console, and carried close under the soffit of the architrave, which, on account of its extraordinary length, requires a support in the middle. The imposts of arches should never be omitted; at least, if they be, a platform ought to supply their place. If columns are employed without pedestals in arcades, they should always be raised on a plinth. In all arches, the circular part ought not to spring immediately from the impost, but take its rise at such a distance above it as is necessary in order to have the whole curve seen at the proper point of view.

The void or aperture of arches should never be higher, nor much lower, than double their breadth; the breadth of the pier should seldom exceed two thirds, nor be less than one third, of the breadth of the arch; and the angular pier ought to be broader than the others, by one half, one third, or one fourth; the impost should not be more than one seventh, nor less than one ninth of the aperture; and the archivolt must not be more than one eighth, nor less than one tenth of it. The breadth of the console must, at the bottom, be equal to that of the archivolt; and its sides must be drawn from the centre of the arch: the length of it must not be less than one and a half of its smallest breadth, nor more than double. The thickness of the pier depends on the breadth of the portico; for it must be strong enough to resist the pressure of its vault. But with regard to the beauty of the building, it should not be less than one quarter of the breadth of the arch, nor more than one third. These are the general dimensions of arches.

CHAP. VIII. Of Orders above Orders.

WHEN, in a building, two or more orders are employed, one above another, the laws of solidity require the strongest should be placed lowermost. Hence the Tuscan must support the Doric, the Doric the Ionic, the Ionic the Composite or Corinthian, and the Composite the Corinthian.

This rule, however, is not always strictly adhered to. Most authors place the Composite above the Corinthian. There are likewise examples where the same order

Principles.

71
How adorned.

72
Proportions

70
Arches
where pro-
per.

Principles.

order is repeated, as in the theatre of Statilius Taurus, and the Coliseum; and others, where an intermediate order is omitted, and the Ionic placed on the Tuscan, or the Corinthian on the Doric. But none of these practices ought to be imitated.

In placing columns above one another, the axis of all the columns ought to correspond, or be in the same perpendicular line, at least in front.

74
Proportions
of columns
placed above
each other.

With regard to the proportions of columns placed above each other, Scamozzi's rule, That the lower diameter of the superior column should constantly be equal to the upper diameter of the inferior one, is universally esteemed the best, and gives all the columns the appearance of one long tapering tree, cut into several pieces. According to this rule, the Doric column will be to the Tuscan, as $13\frac{1}{2}$ to 14; the Ionic to the Doric, as 15 to 16; the Composite or Corinthian to the Ionic, as $16\frac{1}{2}$ to 18; and the Corinthian to the Composite, as $16\frac{1}{2}$ to 20.

In Britain there are few examples of more than two stories of columns in the same aspect: and though in Italy, and other parts of Europe, we frequently meet with three, and sometimes more; yet it is a practice by no means to be imitated; for there is no possibility of avoiding many striking inconsistencies, or of preserving the character of each order in its intercolumnial decorations.

CHAP. IX. Of Basements.

INSTEAD of employing several orders one above the other in a composition, the ground-floor is sometimes made in the form of a *basement*, on which the order that decorates the principal story is placed. The proportion of these basements is not fixed, but depends on the nature of the rooms on the ground-floor. In the palace of the Porti in Vicenza, the height of the basement is equal to that of the order. In some buildings, its height exceeds two thirds of that of the order; and, in others, only half the height of the order. It is not, however, advisable to make the basement higher than the order it supports; neither should it be lower than one half of the order.

76
Decorations, &c.
of basements.

The usual method of decorating basements is with rustics of different kinds. The best, where neatness and finishing is aimed at, are such as have a smooth surface. Their height, including the joint, should never be less, nor much more, than half a module of the order placed on the basement. Their figure may be from a square to a sesquialtera; and their joints may be either square or chamfered. The square ones should not be broader than one eighth of the height of the rustic, nor narrower than one tenth; and their depth must be equal to their breadth; those that are chamfered must form a rectangle; and the breadth of the whole joint may be from one fourth to one third of the height of the flat surface of the rustic.

CHAP. X. Of Pediments.

PEDIMENTS, among the Romans, were used only as coverings to their sacred buildings, till Cæsar obtained leave to cover his house with a pointed roof, after the manner of temples. In the remains of antiquity we meet with two kinds of pediments, the triangular

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lar and the circular. The former of these are promiscuously applied to cover small or large bodies: But the latter, being of a heavier figure, are never used but as coverings to doors, niches, windows, or gates.

As a pediment represents the roof, it should never be employed but as a finishing to the whole composition.

The ancients introduced but few pediments into their buildings, usually contenting themselves with a single one to adorn the middle or principal part. But some of the moderns, and particularly the Italians, have been so immoderately fond of them, that their buildings frequently consist of almost nothing else.

The girder being a necessary part in the construction of a roof, it is an impropriety to intermit the horizontal entablature of a pediment, by which it is represented, to make room for a niche, an arch, or a window.

In regular architecture, no other form of pediments can be admitted, besides the triangular and circular. Both of them are beautiful; and when a considerable number of pediments are introduced, as when a range of windows are adorned with them, these two figures may be used alternately, as in the niches of the Pantheon, and in those of the temple of Diana at Nîmes.

78
Forms, &c.
of pediments.

The proportion of pediments depends upon their size; for the same proportions will not do in all cases.

When the base of the pediment is short, its height must be increased; and when the pediment is long, the height must be diminished. The best proportion for the height is from one fifth to one fourth of the base, according to the extent of the pediment, and the character of the body it covers. The materials of the roof must also be attended to; for if it be covered with tiles, it will be necessary to raise it more than one quarter of the base, as was the custom of the ancients in their Tuscan temples.

The tympan is always on a line with the front of the frieze; and, when large, admits of various ornaments.

CHAP. XI. Of Ballustrades.

BALLUSTRADES are sometimes of real use in buildings; and at other times they are only ornamental. Such as are intended for use, as when they are employed in stair-cases, before windows, or to inclose terraces, &c. must always be nearly of the same height; never exceeding three feet and a half, nor ever less than three. But those that are principally designed for ornament, as when they finish a building, should be proportioned to the architecture they accompany: and their height ought never to exceed four fifths of the height of the entablature on which they are placed; nor should it ever be less than two thirds thereof, without counting the zocholo, or plinth, the height of which must be sufficient to leave the whole ballustrade exposed to view.

The best proportion for ballustrades is to divide the whole given height into thirteen equal parts; eight of these for the height of the ballustrade, three for the base, and two for the cornice or rail; or into fourteen, (if it be required to make the ballustrade less), giving eight parts to the ballustrade, four to the base, and two to the rail. One of these parts may be called a *module*; and

80
Proportions, &c. of
ballustrades.

4 H

being

being divided into nine minutes, may serve to determine the dimensions of the particular members.

In ballustrades, the distance between two ballusters should not exceed half the diameter of the balluster measured in its thickest part, nor be less than one third of it.

The breadth of the pedestals, when they are placed on columns or pilasters, is regulated by them; the dye never being made broader than the top of the shaft, nor much narrower; and when there are neither columns nor pilasters on the front, the dye should not be much lower than a square, and seldom higher. On stairs, or any other inclined planes, the same proportions are to be observed as on horizontal ones.

CHAP. XII. Of Gates, Doors, and Piers.

81
Doors and
gates.

THERE are two kinds of entrances, *viz.* doors and gates. The former serve only for the passage of persons on foot; but the latter likewise admit horsemen and carriages. Doors are used as entrances to churches and other public buildings, to common dwelling houses, and apartments: And gates serve for inlets to cities, fortresses, parks, gardens, palaces, &c. The apertures of gates being always wide, they are generally made in the form of an arch, that figure being the strongest. But doors, which are generally of small dimensions, are commonly parallelograms, and closed horizontally.

The general proportion for the apertures, both of gates and doors, whether arched or square, is, that the height be about double the breadth.

82
Piers.

The most common, and indeed almost the only ornaments for gates are the piers by which they are supported, and which were originally no more than bare posts into which the hinges of the gate were driven. Though this, however, is the only proper use of piers, it must be concealed as much as possible, and they must seem as if placed there only for ornament. As they are to be fixed to the wall before the house, so they must also be proportioned to it; and as they are to be seen in the same view with the front of the house, their correspondence with it is equally necessary. They are to be placed on a plinth, and something must be allowed by way of ornament and finishing at the top. All the luxuriance of fancy may be employed in the decoration of piers: but it will be proper to observe this general rule, that the pier being an inferior building, it must never be richer than the front of the house. If, for instance, the front of the house is ornamented with columns of the Doric order, the Ionic must not be used in the piers; and it will be found better to omit columns altogether, than to make use of the Tuscan order for piers in any case. If the Ionic or Corinthian orders are employed in the front of the house, the Doric or Ionic may be used with propriety in the piers. One piece of ornament is almost universal in piers, namely, a niche with its seat, made as if for the convenience of weary travellers. On this account, it will be proper to raise the columns on pedestals, because the continued moulding from their cap will be a good ornament under the niche. The base of the columns ought always to be the attic.

Inside-doors, however small the building may be, should never be narrower than two feet nine inches;

nor should they ever, in private houses, exceed three feet six inches in breadth, which is more than sufficient to admit the bulkiest person. Their height should at least be six feet three or four inches; otherwise a tall person cannot pass without flopping. In churches, palaces, &c. where there is a constant ingress and egress of people, the apertures must be larger. The smallest breadth that can be given to a gate is $8\frac{1}{2}$ or 9 feet, which is but just sufficient for the passage of a coach.

Plate XXXIII. fig. 1. Is a rustic door, composed by the celebrated Vignola, in which the aperture occupies two thirds of the whole height, and one half of the whole breadth; the figure of it being a double square. The rustics may be either smooth or hatched; their joints must form a rectangle, and the breadth of each joint may be one third, or two sevenths, of the vertical surface of a rustic. The joints of the claveaux, or key-stones, must be drawn to the summit of an equilateral triangle, whose base is the top of the aperture. The architrave surrounding the aperture may be composed either of a large ogee and fillet, or of a plumb and fillet. Its whole breadth must be one tenth of the breadth of the aperture; the remaining part of each pier being for the rustics. The entablature is Tuscan: the cornice is to be one fifteenth of the whole height of the door; and what remains below it being divided into 21 equal parts, the two uppermost of them will be for the frieze and architrave, and the remaining 19 for the rustics and plinth at the foot of the door.

Fig. 2. Is a disposition of Michael Angelo's. The windows of the Capitol at Rome are of this kind; and Sir Christopher Wren hath executed doors of the same kind under the semicircular porches in the flanks of St Paul's. The figure of the aperture may be a double square; the architrave one sixth of the breadth of the aperture; and the whole entablature one quarter of its height. The front of the pilasters or columns, on each side, must be on a line with the fascia of the architrave; and their breadth must be a femidiameter.

Fig. 3. Is likewise a design of Vignola's. It is of the Corinthian order, and executed in the Cancelleria at Rome. The height is equal to double its breadth; and the whole ornament at the top is equal to one third of the height of the aperture. The architrave is in breadth one fifth of the breadth of the aperture; and the pilasters that support the consoles are half as broad as the architrave. The whole is well imagined, but rather heavy; and it will be best to reduce the architrave to one sixth of the aperture, diminishing the entablature proportionally.

Fig. 4. Is a design of Serlio's. The aperture may be either twice as high as broad, or a trifle less. The diameter of the columns may be equal to one quarter of the breadth of the aperture; and their height may be from eight diameters to eight and a half. The entablature must be somewhat less than one quarter of the height of the columns; and the height of the pediment may be one quarter of its base.

Fig. 5. Is a door in the salon of the Farnese at Rome, designed by Vignola. The aperture forms a double square. The entablature is equal to three elevenths of its height, the architrave being one of these elevenths; and the whole ornaments on the sides, consisting

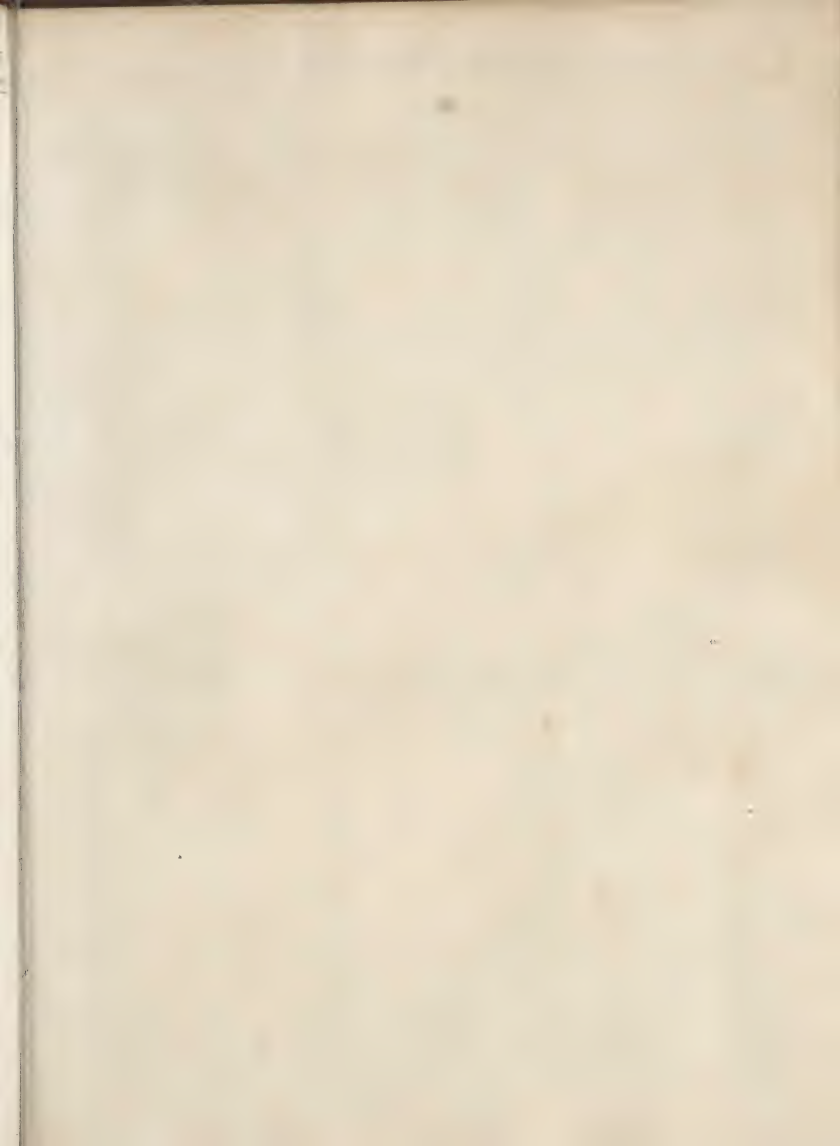


Fig. 1.

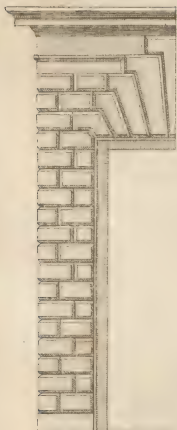


Fig. 2.

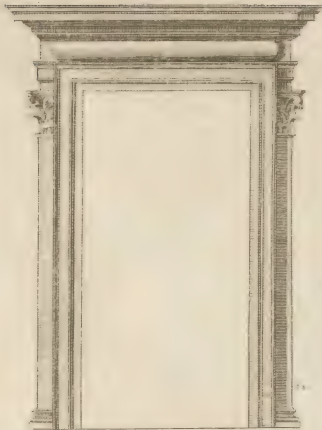


Fig. 3.

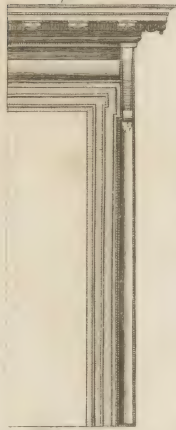


Fig. 4.



Fig. 5.

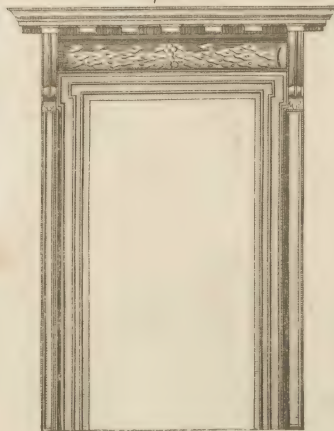
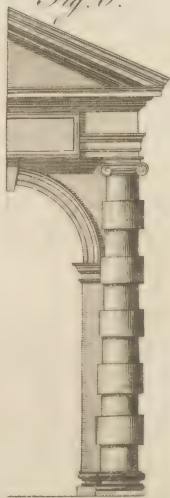


Fig. 6.







fifing of the architrave and pilasters, is equal to two sevenths of the breadth of the aperture; the cornice is Composite, enriched with mutules and dentils; and the frieze is adorned with a festoon of laurel.

Fig. 6. Is copied from a door at Florence, said to be a design of Cigoli's. The height of the aperture is a trifle more than twice its breadth. It is arched; and the impost is equal to half a diameter. The columns are Ionic, somewhat above nine diameters high; and their shafts are garnished each with five rustic cinctures. The entablature is less than one quarter of the column; and the breadth of the tablet, in which there is an inscription, is equal to the breadth of the aperture.

5th Plate XXXIX. fig. 1. Is a pier invented by Mr Chambers. Its diameter may be one quarter of its height, exclusive of the plinth and vase; and the height of both these may be equal to one diameter of the pier, or a trifle less. The rustics may either be plain, hatched, or vermiculated: the height of each course may be one eleventh part of the height of the pier, counting to the top of the entablature; the entablature two elevenths; and the base of the pier one eleventh part.

Fig. 2. Is likewise a composition of Mr Chambers, imitated from M. Angelo Buonarroti's design for Cardinal Sermonetti. The height of the aperture is somewhat more than twice its breadth; which breadth occupies one third of the breadth of the whole composition. The order is Composite; and the height of the entablature is equal to one quarter of the height of the column. He has made a break in it over each column: but, unless the column project considerably, it will be as well to carry the entablature on in a straight line. The dimensions of the particular parts may be measured on the design.

Fig. 3. Is also a composition of Mr Chambers, executed at Goodwood, the seat of his grace the duke of Richmond, in Suffex. The diameter is one quarter of the height, exclusive of the finishing, which is equal to one diameter: and the height of the pier, from the top of the entablature downwards, being divided into eleven and a half parts, one of these parts is given to the base, one to each rustic, and one and a half to the astragal, frieze, and cornice.

Fig. 4. Is a composition of the late earl of Burlington's, that great architect and patron of the fine arts, which is executed at Chiswick, and at Bedford-house in Bloomsbury-square with some little difference.

Fig. 5. Is an invention of Mr Chambers.

Fig. 6. Is one of Inigo Jones's; of which kind he hath executed a couple of piers at Ainsbury in Wiltshire, the seat of his grace the duke of Queenberry.

CHAP. XIII. Of Windows.

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Proportions
of windows.

THE first consideration with regard to windows is their size, which varies according to the climate, the destination of the building, &c. In Britain, the windows of the smallest private houses are commonly from 3 to 3½ feet broad; and being generally twice their breadth in height, or somewhat more, in the principal apartments, they generally rise to within a foot or two of the ceilings of the rooms, which are frequently no higher than 10 feet, and at most 12 or 13. But, in more considerable houses, the apartments are from 15 to 20 feet high, and sometimes more; and in these the

windows are from 4 to 5 and 5½ feet broad, and high in proportion. These dimensions are sufficient for dwelling-houses of any size in this country; when they are larger, they admit too much of the cold air in winter. But churches, and other buildings of that kind, may have larger windows, proportioned to the size of the structures.

The proportions of the apertures of windows depend upon their situation. Their breadth in all the stories must be the same; but the different heights of the apartments make it necessary to vary the height of the windows likewise. In the principal floor, it may be from 2¼ of the breadth to 2½, according as the rooms have more or less elevation. In the ground-story, where the apartments are lower, the apertures of the windows seldom exceed a double square; and, when they are in a rustic basement, they are frequently made much lower. The height of the windows of the second floor may be from 1½ of their breadth to 1¾; and Attics and Mezzanines may be either a perfect square, or somewhat lower.

The windows of the principal floor are generally most enriched. The simplest method of adorning them is, with an architrave furrounding the aperture, and crowned with a frieze and cornice. The windows of the ground-floor are sometimes left entirely plain, without any ornament; and at others they are furrounded with rustics, or a regular architrave with a frieze and cornice. Those of the second floor have generally an architrave carried entirely round the aperture; and the same is the method of adorning Attic and Mezzanine windows: but the two last have seldom either frieze or cornice; whereas the second-floor windows are often crowned with both.

The breadths of all the windows on the same floor should be on the same level, and raised above the floor from two feet nine inches to three feet six inches at the very most. When the walls are thick, the breadths should be reduced under the apertures, for the convenience of looking out. In France, the windows are frequently carried quite down to the floor. When the building is furrounded with gardens, or other beautiful objects, this method renders the rooms exceeding pleasant.

The interval between the apertures of windows depends in a great measure on their enrichments. The breadth of the aperture is the least distance that can be between them; and twice that breadth should be the largest in dwelling-houses; otherwise the rooms will not be sufficiently lighted. The windows in all the stories of the same aspect must be placed exactly above one another.

Plate XXXIV. fig. 1. Is a design of P. Lescot, abbot of Clagny, executed in the old Louvre at Paris. The apertures may be a double square, or a trifle more; the architrave from one sixth to one seventh of the breadth of the aperture: the pilaster is equal to that breadth, when the architrave is narrow; or less, by one quarter, or one fifth, when it is broad. The whole entablature should not exceed one quarter of the height of the aperture, nor be much lower. The consoles may be equal in length to half the breadth of the aperture at most, and to one third of it at least.

Fig. 2. Is a design of Palladio's, executed at the Chiericato in Vicenza: its proportions are not much different

Principles.

Principles.

different from the following. The plat-band that supports the window is equal to the breadth of the architrave.

Fig. 3. Is likewise a design of Palladio's, executed by him in many of his buildings. The aperture is a double square. The breadth of the architrave is one sixth of the breadth of the aperture; and the frieze and cornice together are double the height of the architrave. The breadth of the consoles is two thirds of the breadth of the architrave.

Fig. 4. Is a design of Ludovico da Cigoli; and executed in the ground-floor of the Ranuncini palace at Florence.

Fig. 5. Is a design of Inigo Jones, executed at the Banqueting-house. The aperture may be a double square; the architrave may be one sixth of its breadth; the whole entablature one quarter of its height; and the breadth of the consoles two thirds of the breadth of the architrave.

Fig. 6. Is a design of M. Angelo Buonorati, executed at the Farnese.

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CHAP. XIV. Of Niches and Statues.

It hath been customary, in all ages, to enrich different parts of buildings with representations of the human body. Thus the ancients adorned their temples, baths, theatres, &c. with statues of their deities, heroes, and legislators. The moderns still preserve the same custom, placing in their churches, palaces, &c. statues of illustrious persons, and even groups composed of various figures, representing occurrences collected from history, fables, &c. Sometimes these statues or groups are detached, raised on pedestals, and placed contiguous to the walls of a building, or in the middle of a room, court, or public square. But they are most frequently placed in cavities made in the walls, called *niches*. Of these there are two sorts; the one formed like an arch in its elevation, and semicircular or semi-elliptical in its plan; the other is a parallelogram both in its plan and elevation.

The proportion of both these niches depends on the characters of the statues, or the general form of the groups placed in them. The lowest are at least a double square in height; and the highest never exceed $2\frac{1}{2}$ of their breadth.

With regard to the manner of decorating them, when they are alone in a composition, they are generally inclosed in a panel, formed and proportioned like the aperture of a window, and adorned in the same manner. In this case, the niche is carried quite down to the bottom; but on the sides and at the top, a small space is left between the niche and the architrave of the panel. And when niches are intermixed with windows, they may be adorned in the same manner with the windows, provided the ornaments be of the same figure and dimensions with those of the windows.

The size of the statues depends on the dimensions of the niches. They should neither be so large as to have the appearance of being rammed into the niches, as in Santa Maria Majora at Rome; nor so narrow as to seem lost in them, as in the Pantheon. The distance between the outline of the statue and side of the niche should never be less than one third of a head, nor more than one half, whether the niche be square or arched;

and when it is square, the distance from the top of the head to the ceiling of the niche should not be greater than the distance on the sides. Statues are generally raised on a plinth, the height of which may be from one third to one half of a head; and sometimes, where the niches are large, the statues may be raised on small pedestals.

The character of the statue should always correspond with the character of the architecture with which it is surrounded. Thus, if the order be Doric, Hercules, Jupiter, Mars, Æsculapius, and all male statues representing beings of a robust and grave nature, may be introduced; if Ionic, then Apollo, Bacchus, &c.; and if Corinthian, Venus, Flora, and others of a delicate nature, should be employed.

CHAP. XV. Of Chimney-pieces.

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AMONG the ancients, there are very few examples of chimney-pieces to be met with. Neither the Italians nor French have excelled in compositions of this kind. Britain, by being possessed of many able sculptors at different times, has surpassed all other nations, both in taste of design, and workmanship.

The size of the chimney must be regulated by the dimensions of the room where it is placed. In the smallest apartments, the breadth of the aperture should never be less than three feet, or three feet six inches. In rooms from 20 to 24 feet square, or of equal superficial dimensions, it may be from 4 to $4\frac{1}{2}$ feet broad; in those of 24 to 27, from $4\frac{1}{2}$ to 5; and, in such as exceed these dimensions, the aperture may even be extended to $5\frac{1}{2}$ or 6 feet.

The chimney should always be situated so as to be immediately seen by those who enter the room. The middle of the partition wall is the most proper place in halls, salons, and other rooms of passage; but in drawing-rooms, dressing-rooms, and the like, the middle of the back-wall is the best situation. In bed-rooms, the chimney is always in the middle of one of the partition-walls: and in closets, and other very small places, to save room, it is put in a corner. Where-ever two chimneys are used in the same room, they should be placed either directly facing each other, if in different walls, or at equal distances from the centre of the wall in which they both are.

The proportion of the apertures of chimney-pieces of a moderate size is generally a perfect square; in small ones, it is a trifle higher; and in large ones, a trifle lower. Their ornaments consist in architraves, frizes, cornices, columns, pilasters, termini, caryatides, consoles, and all kinds of ornaments of sculpture, representing animals and vegetables, &c. likewise vases, chalcies, trophies of arms, &c. In designing them, regard must be had to the nature of the place where they are to be employed. Such as are intended for halls, salons, guard-rooms, galleries, and other large places, must be composed of large parts, few in number, of distinct and simple forms, and having a bold relief; but chimney-pieces for drawing-rooms, dressing-rooms, &c. may be of a more delicate and complicated nature.

Chimney-pieces are composed of wood, stone, or marble; the last of which ought to be preferred, as figures or profiles are best represented in a pure white.

Plate XXXV. fig. 1, 2, 3, and 4. are different designs

86
Different
kinds of
niches.

87
How deco-
rated.

88
Statues.

90
Proportions
and situa-
tions.

Fig. 1.

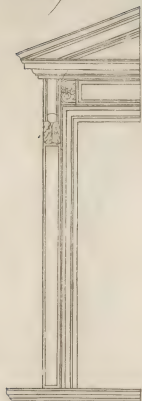


Fig. 2.

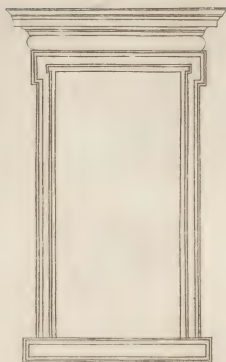


Fig. 3.

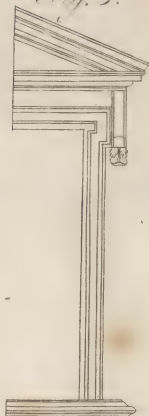


Fig. 4.

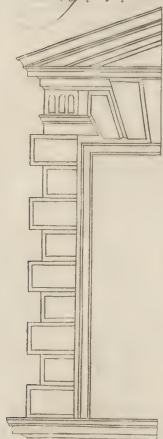


Fig. 5.

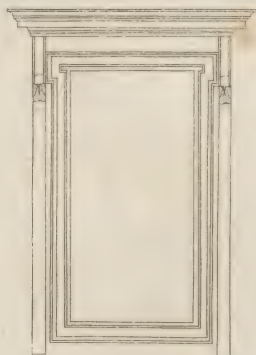


Fig. 6.

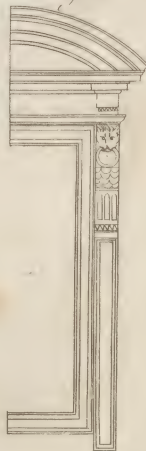




Fig. 1.

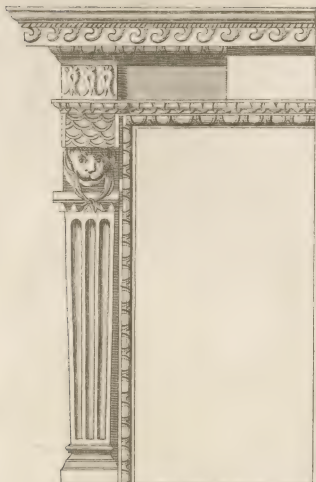


Fig. 2.

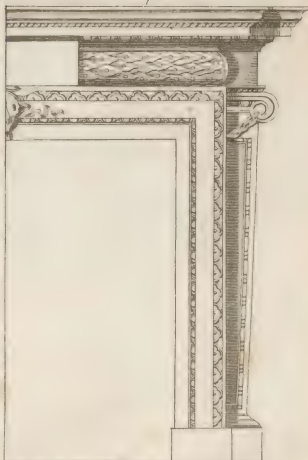
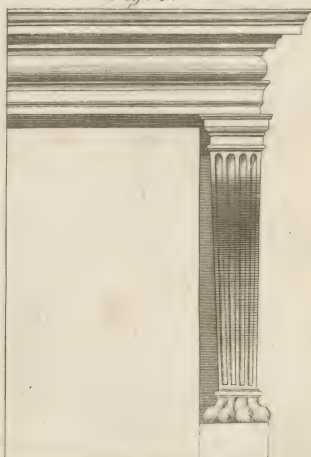
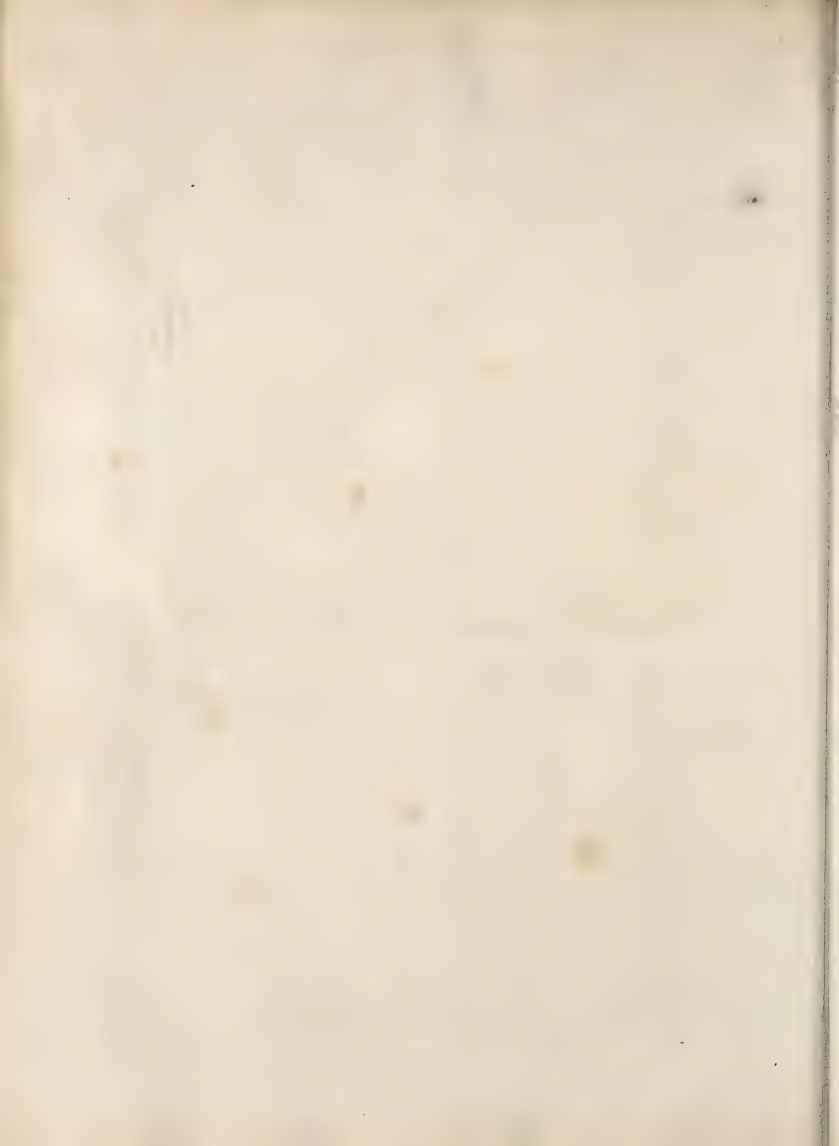


Fig. 3.



Fig. 4.





Principles. signs for chimney-pieces by Palladio and Inigo Jones. Their proportion may be gathered from the designs, which are accurately executed.

Principles.

CHAP. XVI. Of the Proportions of Rooms.

THE proportions of rooms depend in a great measure on their use, and actual dimensions: but, with regard to beauty, all figures, from a square to a sesquilateral, may be employed for the plan.

The height of rooms depends on their figure. Flat cieled ones may be lower than those that are coved. If their plan be a square, their height should not exceed five sixths of the side, nor be less than four fifths; and when it is oblong, their height may be equal to their breadth. But coved rooms, if square, must be as high as broad; and when oblong, they may have their height equal to their breadth, more one fifth, one quarter, or even one third of the difference between the length and breadth: and galleries should at least be in height one and one third of their breadth, and at most one and a half, or one and three-fifths.

High rooms improper in Britain. The coldness of the British climate is a strong objection to high rooms; so that it is not uncommon to see the most magnificent apartments not above 15, 16, or at most 18 feet high; though the extent of the rooms would require a much more considerable elevation. But, where beauty is aimed at, this practice ought not to be imitated.

When rooms are adorned with an entire order, the entablature should never exceed one sixth of the whole height in flat-cieled rooms, and one sixth of the upright part in coved ones; and when there are neither columns nor pilasters, but only an entablature, its height should not be above one seventh of these heights. If the rooms be finished with a simple cornice, it should never exceed one fourteenth, nor ever be less than one fifteenth part of the above-mentioned height.

CHAP. XVII. Of Cielings.

CIELINGS are either flat, or coved, in different manners. The simplest of the flat kind are those adorned with large compartments, surrounded with one or several mouldings, either let into the cieeling, or projecting beyond its surface: and when the mouldings that form the compartments are enriched, and some of the compartments adorned with well-executed ornaments, such cieelings have a good effect, and are very proper for common dwelling-houses, and all low apartments. Their ornaments and mouldings do not require a bold relief; but, being near the eye, they must be finished with taste and neatness. For higher rooms, a flat cieeling which has the appearance of being composed of various joists framed into each other, and forming compartments of various geometrical figures, should be employed. The sides of the joists forming the compartments are generally adorned with mouldings, and represent either a simple architrave, or an architrave-cornice, according to the size of the compartments and the height of the room.

Coved cieelings are more expensive; but they are likewise more beautiful. They are used promiscuously in large and small rooms, and occupy from one fifth to one third of the height of the room. If the room be

low in proportion to its breadth, the cove must likewise be low; and when it is high, the cove must be so likewise: by which means the excess of the height will be rendered less perceptible. But, where the architect is at liberty to proportion the height of the room to its superficial dimensions, the most eligible proportion for the cove is one fourth of the whole height. In parallellogram-figured rooms, the middle of the cieeling is generally formed into a large flat pannel. This pannel, with the border that surrounds it, may occupy from one half to three fifths of the breadth of the room. The figure of the cove is commonly either a quadrant of a circle or of an ellipse, taking its rise a little above the cornice, and finishing at the border round the great pannel in the centre. The border projects somewhat beyond the coves on the outside; and, on the side towards the pannel, it is generally made of sufficient depth to admit the ornaments of an architrave, or architrave and cornice.

In Britain, circular rooms are not much in use; but they are very beautiful. Their height must be the same with that of square rooms; their cieelings may be flat; but they are handsomer when coved, or of a concave form.

Arçes doubleaux, or soffits of arches, when narrow, are ornamented with *guillochis*, or frets; but, when broad, they may be adorned in a different manner.

When the profiles of the room are gilt, the cieelings ought likewise to be gilt. The usual method is to gild all the ornaments, and to leave the grounds white, pearl colour, light blue, or of any other tint proper to set off the gilding to advantage. Painted cieelings, so common in France and Italy, are but little used in Britain.

CHAP. XVIII. Of Stairs and Stair-cases.

THERE are many kinds of stair-cases: for, in some, the steps are made straight; in others, winding; in others, mixed of both. Of straight stairs, some fly directly forward, others are square, others triangular. Others are called *French flights*, or *winding-stairs*, (which in general are called *spiral*, or *cockle-stairs*); of which some are square, some circular or round, and some elliptical or oval; and these again are various, some winding about a solid, others about an open newel. Stairs mixed of straight and winding steps are also of various kinds; some are called *dog-legged*; some there are that wind about a solid newel, and others that fly about a square open newel.

Great care ought to be taken in placing of the stair-cases in any building; and therefore stair-cases ought to be described and accounted for justly when the plan of a building is made. For want of this, sometimes unpardonable errors have been committed: such as having a little blind stair-case to a large house, or, on the other hand, a large spacious stair-case to a little one.

Palladio says, in placing stair-cases, the utmost care ought to be taken; it being difficult to find a place convenient for them, that will not at the same time prejudice the rest of the building. But commonly the stairs are placed in the angle, wing, or middle of the front.

To every stair-case are required three openings.

First, the door leading thereto.

Principles. Secondly, the window, or windows that give light to it; Principles.

And, thirdly, the landing.

First, the door leading to the stair-case should be so placed, that most of the building may be seen before you come at the stairs, and in such a manner that it may be easy for any person to find out.

Secondly, for the windows; if there be but one, it must be placed in the middle of the stair-case, that thereby the whole may be enlightened.

Thirdly, the landing of stairs should be large and spacious, for the convenient entering into rooms: in a word, stair-cases should be spacious, light, and easy in ascent. The height of large steps must never be less than six inches, nor more than seven inches and a half.

The breadth of steps should never be less than 10 inches, nor more than 18 inches; and the length of them not less than three feet, nor more than 12.

Plate XXXVI. fig. 1. A stair-case of two flights.—*A* shews the manner of drawing the *ramp*, which is to rise equal to the height of the first step of the next flight, and as much as its *kneeling*; as is shewn by the *ramp* intersecting the rail of the second flight.

Fig. 2. Shews the straight rail intersecting a circular cap.

Fig. 3. Section of two different hand-rails.

Fig. 4. Shews the manner of dove-tailing the riser into the step.

Plate XXXVII. fig. 1. Represents a stair-case, with flights, and its landing-rail.

Fig. 2. Shews the solid part of the step out of which the scroll is formed; where *a* represents the *overfall* of the step; *b*, The thickness of the bracket, with its *mitring* to the riser; and, *c*, The *spring-board*.

Fig. 4. Shews the scale for drawing the scroll of fig. 3.—To perform which, take the distance from 1 to the centre, in fig. 3, and set it from 1 to the centre in fig. 4; divide that extent into three parts, then set four such parts on the upper side of the scale, and draw the line from 4 to 1; set one foot of your compasses at 4, and strike the circular line; let that be divided into 12 equal parts, and then draw lines from 4 through those divisions to the upright line.

The scale being thus made, draw the scroll of fig. 3, by it in the following manner.

Set one foot of your compasses in 1, and describe a stroke at *c*; take the same distance, and with one foot in 2, cross the stroke at *c*; then from *c*, turn the part from 1 to 2, and proceed in the same manner; for if the distance were taken in the scale from 1 to the centre, it would strike the circle too flat; and if taken from 2, it would strike the circle too quick.

When this is well understood, there will be little difficulty in drawing the scroll below fig. 2; which throws itself out farther in proportion than that in fig. 3; for this will always be the case when the upper line of the scale, which consists of four divisions in fig. 4, is made but with three divisions or less; whence it appears, that the upper line of the scale may be drawn at what length you please, according as you would bring in or keep out the scroll.

Plate XXXVIII. Shews the manner of squaring twist-rails.

Fig. 2. Exhibits the pitch-board, to shew what part of the step the twisted part of the rail contains;

the three dotted lines drawn from the rail to the pitch-board represent the width of the rail, which is to be kept level. The dotted lines *a* and *b* shew how much half the width of the rail turns up from its first beginning to 3.

Fig. 3. Shews the same pitch-board, with the manner of the rail's turning up. If the sides of the twisted part of the rail be shaped by the rail-mould, so that they direct down to its ground-plan, that is, the upper side of the rail being first struck by the mould, then apply the mould to the under side, as much back as the level of the pitch-board shews, by being struck on the side of the rail, and then fig. 3, being applied to the outside of the rail, from its first twisting part to 3, will shew how much wood is to be taken off.

Fig. 5. Exhibits the square of the rail, with the raking line of the pitch-board drawn through the middle on the upper side; then draw the depth of the side the rail parallel to this, and the dotted lines from the diagonal of the rail; these lines shew what quantity of wood will be wanting on the upper and lower sides of the rail. Set your compasses at *c*, and draw the circular stroke from the raking part of the pitch-board to *b*; take the distance *a b* and transfer it from *a* to *b*, in fig. 7. The several distances thus found may be set at any number of places, ranging with the straight part of the rail; and it then forms the width of the mould for the twisting part of the rail.

Fig. 7. Shews the sweep of the rail. The rail cannot be fixed less than one fourth part from the *rising* or front of the step.

The remaining part of the pitch-board may be divided into any number of parts, as here into four; from these divisions draw lines across the pitch-board to the raking line; then take the distances from the ground-line of the pitch-board to the plan of the rail, and set them perpendicular from the raking line of the pitch-board; and these divisions, when the rail is in its proper position, lie directly over the divisions on the ground plan.

In this figure *l*, *m*, and *n*, rise as much above *o* as the dotted line in fig. 5, does above the width of the rail; and they sink as much below *o* as the other dotted line in fig. 5, falls below the width of the rail; the same thicknesses must be glued upon *o*, though the greatest part will come off in squaring. The reason of placing the letters *l*, *m*, and *n*, where they are, is, that they might not obstruct the small divisions of the rail-mould.

Fig. 4. Shews how to find the rail when it takes more than one step. The remaining part of the pitch-board is divided into four parts, as before in fig. 7 and it takes in two such parts of the next step. Draw lines from these divisions to the diagonal of the pitch-board as in fig. 7, then take the distance *a b*, and set it from *c* to *d*, and so proceed with the other divisions.

Another way to find the outside of the rail-mould is, to draw all the divisions across the plan of the rail; then take the distance from the ground-line of the pitch-board to 4, transfer it from the diagonal of the pitch-board to 4 on the rail; and so proceed with the other distances. Now, when the rail is put in its proper situation, *c* will be perpendicular to *b*, and all the divisions, as 1, 2, 3, 4, &c. in the rail, will be perpendicular to 1, 2, 3, 4, &c. in the ground-plan.

Fig. 6. Shews the plan of a rail of five steps.

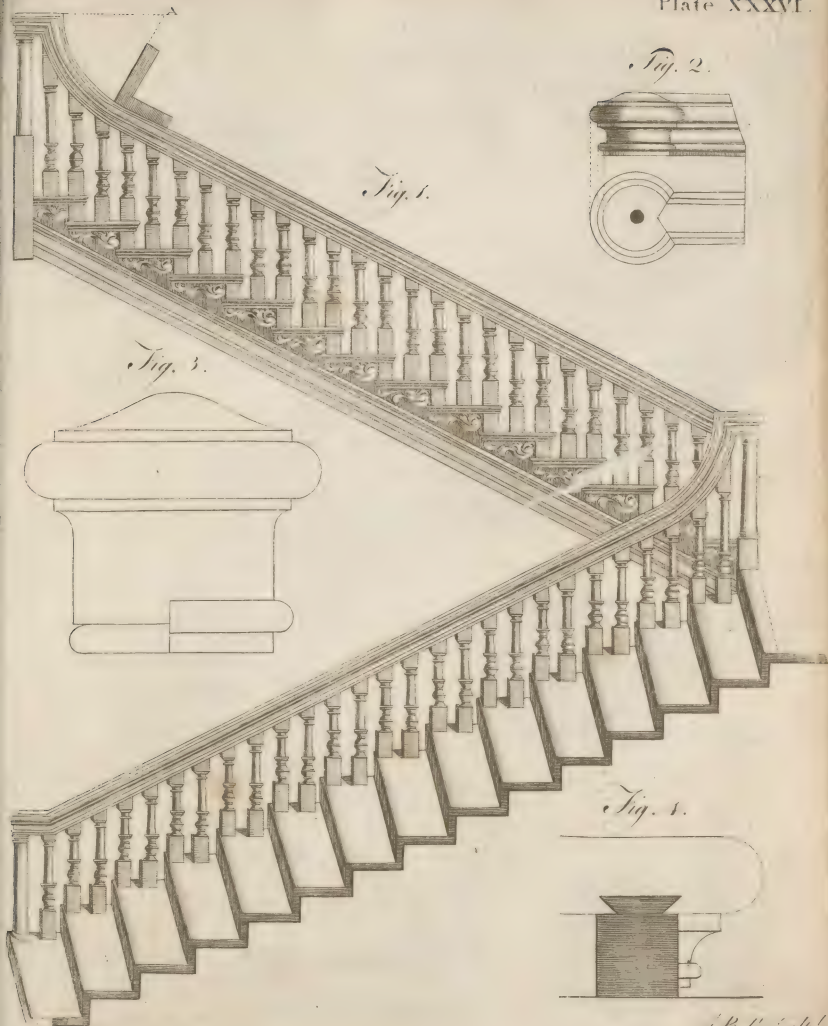




Fig. 1.

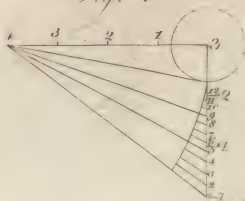


Fig. 3.

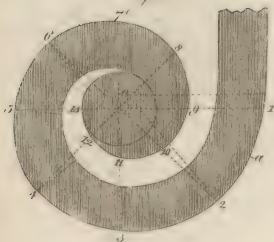


Fig. 1.

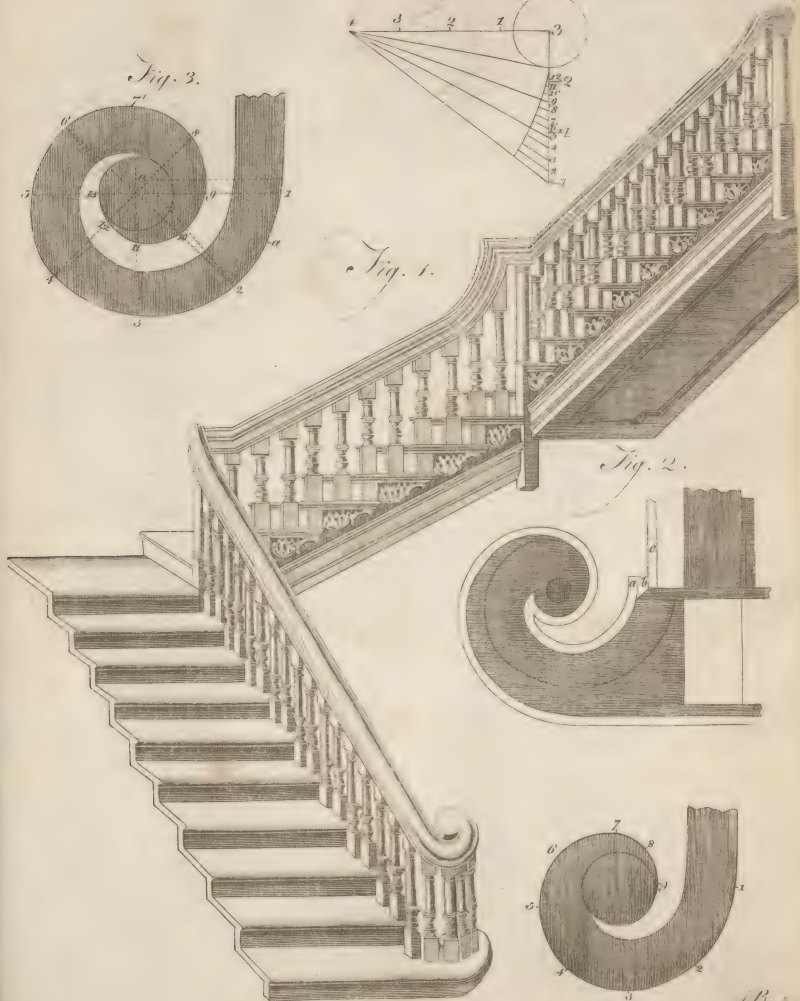
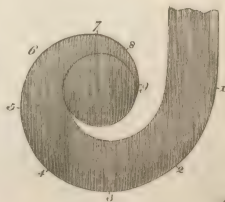
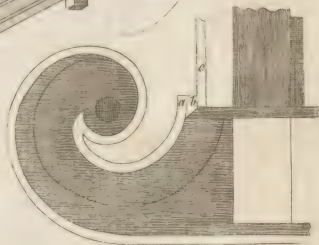


Fig. 2.





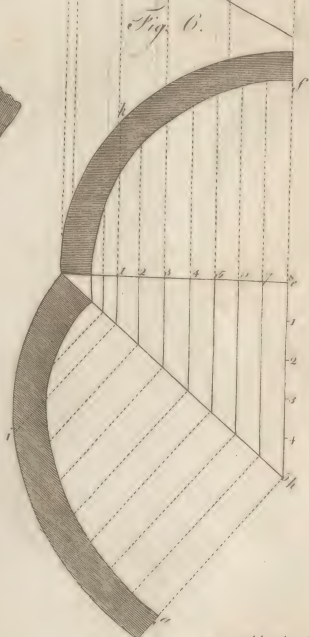
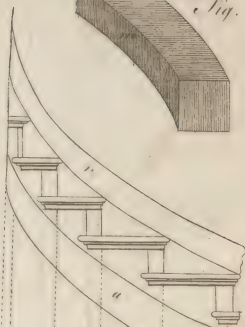
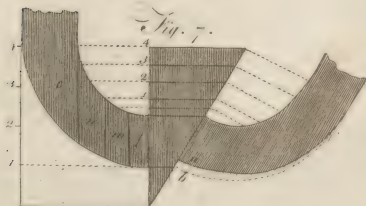
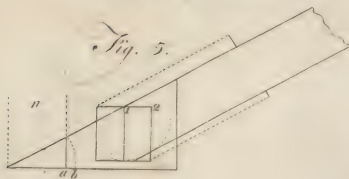
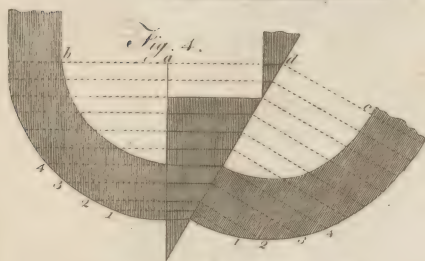
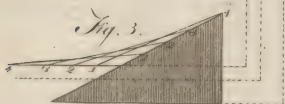






Fig. 1.

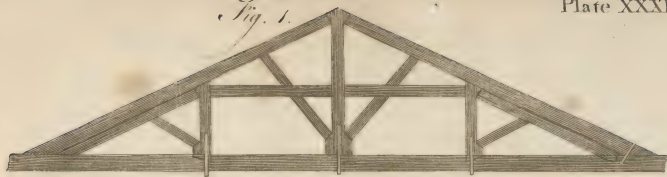


Fig. 2.

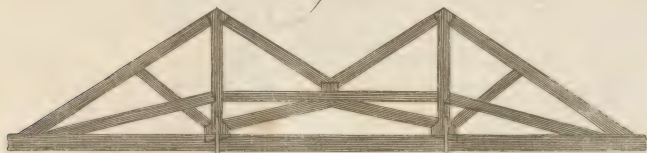


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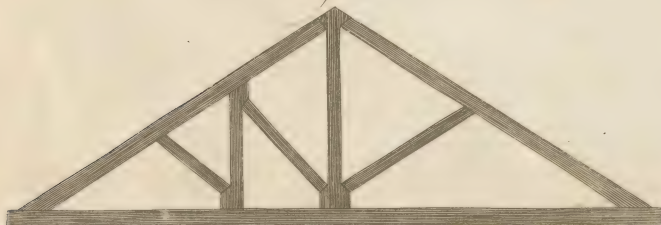


Fig. 4.



Fig. 5.

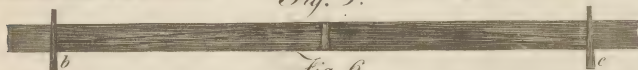
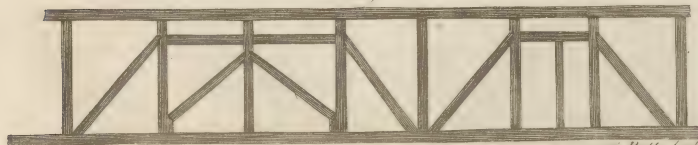


Fig. 6.



To find the rail.—Set five divisions, as from e to h , which is the height of the five steps; draw the diagonal b to the plan of the rail; then take the distance $e f$, and transfer it to $g h$, and proceed in the same manner with the other seven distances.

To find the width of the rail-mould.—Draw the lines across the plan of the rail, as at k ; set that distance from the diagonal to i ; and so proceed with the rest, as was shewn in fig. 4.

Having formed the sides of the rail perpendicular to its ground-plan, and having squared the lower end of the rail, then take a thin lath, and bend it with the rail, as is represented by m fig. 1.

This is the readiest method of squaring a solid rail; but if the rail be bent in the thickneſſes, the noſing of the ſteps muſt be drawn upon a cylinder, or ſome other ſolid body of a ſufficient width to contain the width of the rail or ſtring-board.

r Represents the depth of the rail, touching the noſe of each ſtep. Take a ſufficient number of thickneſſes of this width, to make the thickneſs of your rail; glue them all together upon your cylinder or templet, con-

fine them till they are dry, and the rail taken off is ready ſquared. Proceed in the ſame manner with the architrave, marked a .

CHAP. XIX. Of Roofs.

99

PLATE XXIX. Fig. 1. Shews the form of a truſſed roof, with three ring-poſts, that may carry ſeventy feet, or upwards.

Fig. 2. Exhibits an M roof, capable of carrying as great an extent as the former. Indeed both theſe deſigns are capable of carrying almoſt any extent.

Fig. 3. Represents two different ſorts of truſſes.

Fig. 4. Shews the manner of piecing timber. Sometimes the joint may be extended as far as a , with another bolt through it. To the right is ſhewn a different ſort of joint.

Fig. 5. Shews the manner of truſſing a girder. If the truſſes are full long, with the pieces b and c you may make them as light as you pleaſe.

Fig. 6. Represents the manner of truſſing partitions.

PART II. PRACTICE OF ARCHITECTURE.

HAVING thus deſcribed and given rules for the moſt generally received proportions of the different parts of buildings, both of the uſeful and ornamental kind, we muſt next give an account of the method of erecting different kinds of edifices; and here the judgment of the architect muſt neceſſarily be very much employed, as no fixed rules have been laid down by which he can be directed in all caſes. As a neceſſary preliminary, however, to the conſtruction, we muſt firſt conſider,

CHAP. I. The Situations of Houſes.

THOUGH it muſt be, in many caſes, impoſſible to chuſe ſuch a ſituation as might be agreeable either to the architect or the proprietor, yet, where a choice can be made, there are certainly a great many circumſtances that will determine one ſituation to be preferable to another. Theſe circumſtances depend entirely on the perſon who is to inhabit the houſe. A farmer, for inſtance, ought to dwell in the moſt central part of his farm; an independent gentleman muſt regard the healthineſs, the neighbours with whom he can conſerve, the proſpect from his houſe, and alſo the aſpect of the ground near it. To answer theſe purpoſes of health and pleaſure, an open elevated ſituation is the beſt, as the air is there pure, and the proſpect extenſive; but too elevated a ſituation is diſagreeable, as being both difficult of acceſs, and expoſed to cold and bleak winds. To build in bottoms between hills is both unhealthy and unpleaſant, the houſe being in a manner buried, and the ground near it generally marſhy from the rain-water which runs down from the hills, which renders the air unwholeſome. As a garden alſo is a very neceſſary article to a country habitation, the ſoil is by no means a matter of indifference; and therefore it may be concluded, that an elevated ſituation on a gravelly loam, near ſome running water, is the beſt ſituation for a country houſe.

CHAP. II. Of the Conſtruction of Edifices in general.

THE proper ſituation of a houſe, or any other building, being choſen, according to its intended nature, the next thing to be conſidered is to lay the foundation in a proper manner. The only ſecurity of a houſe, or any other building whatever, is in having a good foundation, and no error is ſo dangerous as that which is committed here; as the ſhrinking of the foundation but the breadth of a ſtraw may cauſe a rent of five or ſix inches wide in the ſuperſtructure. To guard againſt errors of this kind, the qualities of the ground for a conſiderable depth muſt be carefully obſerved.

The beſt foundation is that which conſiſts of gravel or ſtone; but, in order to know whether the inferior ſtrata are ſufficient for the ſupport of the building, it will be adviſeable to ſink wells at ſome little diſtance. By attending to what is thrown up in digging theſe, the architect will be acquainted with what lies under the ſtony or gravelly bed which on the ſurface promiſes ſo much ſecurity, and will know what meaſures to take.

But though a ſtony or gravelly bottom is undoubtedly the moſt ſure and firm, where all is found beneath, there is no kind of ground which may prove more falſe, or occaſion ſuch terrible accidents. The reaſon of this is, that ſuch kind of ground often contains abſolute vacuities; nor is rock itſelf, though a foundation upon a rock is ſtrong even to a proverb, free from dangers of the ſame kind. Caverns are very frequent in rocky places; and ſhould an heavy building be erected over one of theſe, it might ſuddenly fall down altogether. To guard againſt accidents of this kind, Palladio adviſes the throwing down great weights forcibly on the ground, and obſerving whether it ſounds hollow, or ſhakes; and the beating of a drum upon it, by the ſound of which an accuſtomed ear will know whether the earth is hollow or not.

Where the foundation is gravel, it will be proper to examine

101
Qualities of the ground
neceſſary to be examin-
ed.

102
Rocky ground
ſometimes dangerous.

Practices.

examine the thickness of the stratum, and the qualities of those that lie under it, as they have appeared in digging. If the bed of gravel is thick, and the under strata of a found and firm kind, there needs no assistance; if otherwise, we must have recourse to various methods in order to supply the defect.

103
Sandy or
boggy
ground how
managed.

The other matters which may occur for a foundation are clay, sand, common earth, or rotten boggy ground. Clay will often both raise and sink a foundation; yet it has a solidity which, with proper management, is very useful. The marshy, rotten, or boggy ground is of all others the worst; yet even upon this great buildings may be raised with perfect safety, provided proper care be taken. In case of boggy earths, or unfirm sand, piling is one of the most common methods of securing a foundation; and, notwithstanding the natural disadvantage of the earth, piles, when properly executed, are one of the firmest and most secure foundations.

104
Founda-
tions near
waters dan-
gerous.

In foundations near the edge of waters, we should always be careful to found to the very bottom, as many terrible accidents have happened from the ground being undermined by rivers. The same method is to be followed when the ground on which we build has been dug or wrought before. It ought never to be trusted in the condition in which it is left; but we must dig through it into the solid and unmoved ground, and some way into that, according to the weight and bigness of the intended edifice. The church of St Peter's at Rome is an instance of the importance of this last observation. That church is in great part built upon the old circus of Nero; and the builders having neglected to dig through the old foundation, the structure is consequently so much the weaker. The walls were judged of strength enough to bear two steeples upon the corners of the frontpiece; but the foundation was found too weak when it was impossible to remedy the defect perfectly.

105
Defect in St
Peter's at
Rome.

Before the architect, however, begins to lay the foundation of the building, it will be proper to construct such drains as may be necessary for carrying off the rain, or other refuse water that would otherwise be collected and lodge about the house. In making of drains for carrying off this water, it will be necessary to make large allowances for the different quantities that may be collected at different times. It must also be considered, that water of this kind is always loaded with a vast quantity of sediment, which by its continual falling to the bottom will be very apt to choke up the drain, especially at those places where there happen to be angles or corners in its course. The only method of preventing this is by means of certain cavities disposed at proper distances from one another. Into these the sediment will be collected, and they are for that reason called *sefipools*. With regard to these, the only directions necessary are, that they be placed at proper distances, be sufficiently large, and placed so as to be easily cleaned. It is a good rule to make a *sefipool* at each place where the water enters the drain; as by this means a considerable quantity of sediment will be prevented from entering the channel at all. Others are to be made at proper distances, especially where there are any angles. They must be made sufficiently large; the bigger, in moderation, the better; and they must also be covered in such a manner as to be easily got at

106
Drains how
made.

107
sefipools.

in order to be cleaned. But, as putrid water is exceedingly noxious, it will be necessary to carry up a brick funnel over every *sefipool*, in order to prevent the collection of the putrid effluvia, which would otherwise occasion the death of the person who cleaned it.

Practice.

108
Proportion
of Drains.

All drains ought to be arched over at top, and may be most conveniently built of brick. According to their different sizes, the following proportions of height and thickness may be observed. If the drain is 18 inches wide, the height of the walls may be one foot, and their thickness nine inches; the bottom may be paved with brick laid flatwise, and the arch turned four inches. If the drain is 22 inches wide, the side walls are then to be one foot three inches in height, and the rest constructed as before. If it is 14 inches wide, the height of the walls may be 9 inches, and the sweep of the arch four. A drain of a yard wide should have the same height, and the arch turned over it ought to be 9 inches thick. Upon the same principles and proportions may other drains of any size be constructed.

109
Foundation
of buildings
how laid.

The sewers and drains being constructed in a manner proportioned to the size of the intended building, the architect may next proceed to lay the foundation of the walls. Here the first care must be, that the floor of the foundation be perfectly smooth and level. The Italians begin with laying over it an even covering of strong oak plank; and upon that they lay, with the most exact care, the first course of the materials. Whether we take this method, or begin upon the naked floor, all must be laid with the most exact truth by rule and line. When the board plat is laid, a course of stone is the best first bed, and this is to be laid without mortar; for lime would make the wood decay, which otherwise, in a tolerably good soil, will last for ages. After this, all the courses should follow with the same perfect evenness and regularity. If the materials are brick, they should be laid on with an equal, and not too great, quantity of mortar; if stone, they ought to be placed regularly, and in the same situation in which they lay in the quarry: for many stones, which will bear any weight flatwise, and in their natural position, are of such a grain, that they will split otherwise. The joinings of the under course must be covered by the solid of the next course all the way up; and the utmost care must be taken that there be no vacancy left in the wall, for the weight will most certainly crush it in. The less mortar there is in a foundation, the better. Its use is to cement the bricks and stones together; and the evenness they are, the less will be required for that purpose. Where mortar is used to fill up cavities, it becomes part of the wall; and not being of equal strength with the solid materials, it takes from the firmness of the building. For the same reason, nothing can be more absurd than to fill up a foundation with loose stones or bricks thrown in at random; and where this is done, the ruin of the building is inevitable. Where the foundation of a principal wall is laid upon piles, it will be necessary also to pile the foundations of the partitions, though not so strongly.

The thickness of foundation-walls in general ought to be double that of the walls which they are to support. The looser the ground, the thicker the foundation wall ought to be; and it will require the same addition also in proportion of what is to be raised upon it. The plane of the ground must be perfectly level, that the

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Thickness
and dimin-
utions of
of walls, &c.

Practice. the weight may press equally every where : for when it inclines more to one side than another, the wall will split. The foundations must diminish as they rise, but the perpendicular is to be exactly kept in the upper and lower parts of the wall ; and this caution ought to be observed all the way up with the same strictness. In some ground, the foundation may be arched ; which will save materials and labour, at the same time that the superstructure has an equal security. This practice is peculiarly serviceable where the foundation is piled.

Diminution of the thickness of walls. As the foundation-walls are to diminish in thickness, so are those which are built upon them. This is necessary in order to save expence, but is not absolutely so to strengthen the wall ; for this would be no less strong though it was continued all the way to the top of an equal thickness, provided the perpendicular was exactly kept. In this the ancients were very expert ; for we see, in the remains of their works, walls thus carried up to an exorbitant height. It is to be observed, however, that, besides perfect truth in their perpendiculars, they never grudging iron work, which contributed greatly to the strength of their buildings. The thickness and diminution of walls is in a great measure arbitrary. In common houses built of brick, the general diminution from the bottom to the top is one half the thickness at the bottom ; the beginning is two bricks, then a brick and an half, and lastly one brick, thickness. In larger edifices, the walls must be made proportionally thicker ; but the diminution is preferred much in the same manner. Where stones are used, regard must be had to their nature, and the propriety of their figures for holding one another. Where the wall is to be composed of two materials, as stone and brick, the heaviest ought always to be placed undermost.

Angles how fortified. There is one farther particular regarding the strength of a plain wall, and that is, the fortifying its angles. This is best done with good stone on each side, which gives not only a great deal of strength, but a great deal of beauty. Pilasters properly applied are a great strengthening to walls. Their best distance is about every 20 foot, and they should rise five or six inches from the naked of the wall. A much slighter wall of brick with this assistance, is stronger than a heavier and massier one built plain. In brick walls of every kind, it is also a great addition to their strength to lay some chief courses of a larger and harder matter ; for these serve like sinews to keep all the rest together, and are of great use where a wall happens to sink more on one side than another. As the openings in a wall are all weakenings, and as the corners require to be the strongest parts, there should never be a window very near a corner. Properly, there should always be the breadth of the opening firm to the corner. In the most perfect way of forming the diminution of walls, the middle of the thinnest part being directly over the middle of the thickest, the whole is of a pyramidal form ; but where one side of the wall must be perpendicular and plain, it ought to be the inner, for the sake of the floors and cross walls. The diminished side, in this case, may be covered with a fascia or cornice, which will at once be a strength and ornament.

Windows improper near the corners. Along with the construction of walls, that of the chimneys must also be considered ; for errors in the construction of these will render the most elegant building extremely disagreeable. The common causes of smoke-

ing are either that the wind is too much let in above at the mouth of the shaft, or the smoke is stifled below : and sometimes a higher building, or a great elevation of the ground behind, is the source of the mischief ; or, lastly, the room in which the chimney is may be so small or close, that there is not a sufficient current of air to drive up the smoke. Almost all that can be done while the walls are constructing to prevent smoke is, to make the chimney vent narrower at bottom than at top ; yet this must not be carried to an extreme ; because the smoke will then linger in the upper part, and all the force of the draught will not be able to send it up. —As for the methods of curing smoky chimneys in houses already built, see the article CHIMNEY.

Roofs. After the walls are finished, the roof is the next consideration : but concerning it very little can be said ; only that its weight must be proportioned to the strength of the walls. It must also be so contrived as to press equally upon the building ; and the inner walls must bear their share of the load as well as the outer ones. A roof ought neither to be too massy, nor too light ; as being necessary for keeping the walls together by its pressure, which it is incapable of doing while too light ; and if too heavy, it is in danger of throwing them down. Of these two extremes, however, the latter is to be accounted the worst.

Floors. With regard to the floors, they are most commonly made of wood ; in which case, it will be necessary that it should be well seasoned by being kept a considerable time before it is used. The floors of the same story should be all perfectly on a level ; not even a threshold rising above the rest : and if in any part there is a room or closet whose floor is not perfectly level, it ought not to be left so, but raised to an equality with the rest ; what is wanting of the true floor being supplied by a false one.

In mean houses, the floors may be made of clay, ox blood, and a moderate portion of sharp sand. These three ingredients, beaten thoroughly together and well spread, make a firm good floor, and of a beautiful colour. In elegant houses, the floors of this kind are made of plaster of Paris, beaten and sifted, and mixed with other ingredients. This may be coloured to any hue by the addition of proper substances ; and, when well worked and laid, makes a very beautiful floor. Besides these, halls, and some other ground-rooms, are paved or floored with marble or stone ; and this either plain or dotted, or of a variety of colours : but the universal practice of carpeting has in a great measure set aside the bestowing any ornamental workmanship upon floors. In country buildings, also, floors are frequently made of bricks and tiles. These, according to their shapes, may be laid in a variety of figures ; and they are also capable of some variation in colour, according to the nature of the earth from which they were made. They may be laid at any time ; but for those of earth or plaster, they are best made in the beginning of summer, for the sake of their drying.

CHAP. III. Of the Distribution of the Apartments of Houses, with other conveniences.

As houses are built only for the sake of their inhabitants, the distribution of the apartments must of necessity be directed by the way of life in which the inhabitants

Practice.

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Plan of a
farm-house.

habitants are engaged. In the country, this is commonly farming; and here, besides the house for the family, there is also necessary a barn for the reception of the produce of the ground, a stable for cattle, a cart-house for keeping the utensils under cover, and sheds for other uses.—To accomplish these purposes, let a piece of ground be taken of five times the extent of the front of the house, and inclosed in the least expensive manner. Back in the centre of this let the house be placed, and in the front of the ground the barn and the stable, and the adjoining sheds. These are to be set, one on each side, to the extreme measure of the inclosed ground: they will thus fill up a part of the entrance, and will leave all about the house some inclosed ground by way of yard. From the barn to the stable may be extended a fence with a gate in the middle, and this gate ought to front the door of the house.

This much being settled, the plan of the house and out-buildings may be made as follows. The door may open into a plain brick passage, at the end of which may be carried up a small stair-case. On one side of the passage may be a common kitchen; and on the other side a better or larger room, which will serve the family by way of parlour. Beyond this may stand on one side the pantry, and on the other the dairy room, the last being twice the size of the former. They are placed on the same side with the parlour, on account of the heat of the kitchen, which renders it improper to be near them. On the kitchen side, a brew-house may very conveniently be placed. More rooms may be added on the ground-floor as occasion requires; and the upper story is to be divided into bed-chambers for the family, with garrets over them for the servants.—A house of this kind is represented 2^d Plate XXXIX. fig. 1; and (fig. 2.) one of a somewhat better kind, where a private gentleman who has a small family may find convenience.

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Of an elegant country seat.

3^d Plate XXXIX. fig. 1. represents a gentleman's country-seat, built on a more elegant plan. Here the front may extend 65 feet in length, the depth in the centre being 40 feet, and in each of the wings 45. The offices may be disposed in wings; the kitchen in the one, and the stables in the other; both of which, however, may correspond in their front with the rest of the building, which they ought also to do with one another. These wings may have a projection of 13 feet from the dwelling-house, to which they ought to be connected, not by straight lines, but by curves, as represented fig. 2.

The best proportion of these offices to a house extending 65 feet in front, is 35 feet. If they are smaller, the house will look gigantic; if larger, they will lessen its aspect. To a front of 35 feet, a depth of 48 is a very good proportion. There ought also to be a covered communication between the dwelling-house and offices, which must not appear only to be a plain blank wall, but must be ornamented with gates, as in the figure. The arch by which the offices are joined to the dwelling-house must be proportioned to the extent of the buildings; and there cannot be a better proportion than five feet within the angles of the buildings. By this means the wings, which have only a projection of 13 feet, will appear to have one of 18, and the light will be agreeably broken.

With regard to the internal distribution of a house of this kind, the under story may be conveniently di-

vided into three rooms. The hall, which is in the centre, will occupy the whole of the projecting part, having a room on each side. The length of the hall must be 24 feet, and its breadth 12: the rooms on each side of it must be 16 feet long, and 11 wide. Of these two front rooms, that on the right hand may be conveniently made a waiting-room for persons of better rank, and that on the left hand a dressing-room for the matter of the house. Behind the hall may run a passage of four feet and an half, leading to the apartments in the hinder part of the house, and the stair-case. These may be disposed as follows. Directly behind the hall and this passage the space may be occupied by a saloon, whose length is 24 feet, and its breadth 17. On the left hand of the passage, behind the hall, is to be placed the grand stair-case; and as it will not fill the whole depth, a pleasant common parlour may terminate on that side of the house. On the other side, the passage is to lead to the door of the great dining parlour, which may occupy the whole space.

A plan of a house of the same kind, but somewhat different in the distribution, is represented fig. 2. The front here extends 68 feet, and the wings project 28 feet; their depth is 48, and their breadth 36. The hall may be 26 feet long, and 17 broad. On the left hand of the hall may be a waiting-room 16 feet long, and 10 broad; behind which may be a handsome dining-room. The passage into this waiting-room should be at the lower end of the hall; and it must have another opening into the room behind it. On the right hand of the hall is the place of the great stair-case, for which a breadth of 16 feet three inches is to be allowed. In the centre of the building, behind the hall, may be a drawing-room 26 feet long, and 16 broad; and behind the stair-case will be room for a common parlour of 16 feet square. The passage of communication between the house and wings may be formed into colonnades in a cheap manner behind: a flight of steps, raised with a sweep, occupying the centre of each, and leading up to a door, and the covering being no more than a shed supported by the plainest and cheapest columns.

The two wings now remain to be disposed of. That on the right hand may contain the kitchen and offices belonging to it, and the other the stables. The front of the right-hand wing may be occupied by a kitchen entirely, which will then be 30 feet long, and 16½ wide; or it may be made smaller, by setting off a small room to the right. Twenty-two feet by 16 will then be a good bigness. The other room will then have the same depth of 16 feet, and the width to the front may be 7½. Beyond the kitchen may stand the stair-case, for which 7½ feet will be a proper allowance; and to the right of this may be a scullery 12 feet 10 inches deep from the back front by 7 in breadth. To the left of the stairs may be a servants hall 16 feet square, and behind that a larder 12 feet 10 by 14 feet 6. In the centre of the other wing may be a double coach-house: for which there should be allowed the whole breadth of the wings, with 10 feet 6 inches in the clear; and on each side of this may be the stables. The external decorations of the front and wings will be better understood from the figure than they can be by any description.

4th Plate XXXIX. shews the plan and elevation of the house of Francis Charteris, Esq; at Newmills. The proportions

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Another.
3^d Plate
XXXIX.120
Of Mr. Charteris's house.

Fig. 1.



Scale of Feet.

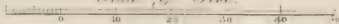
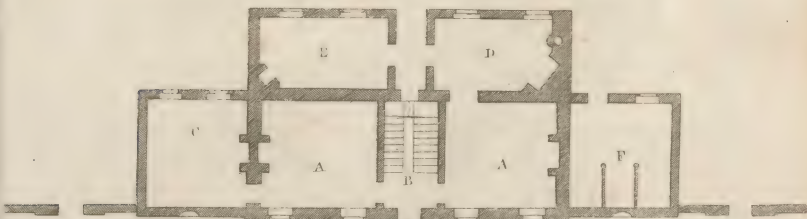
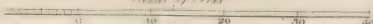


Fig. 2.

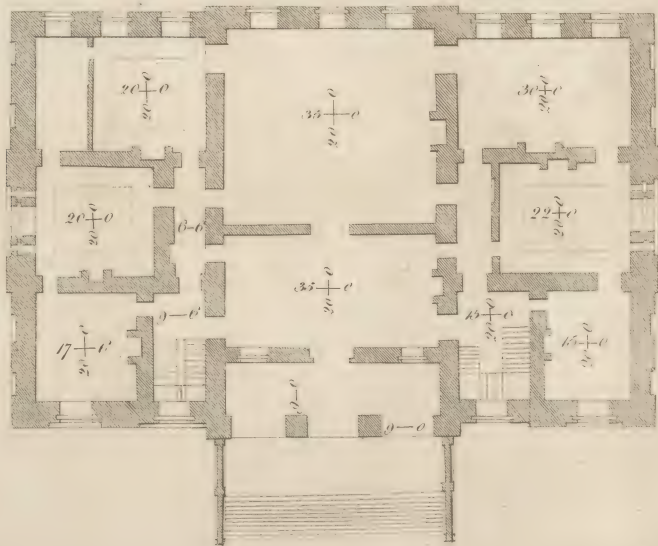
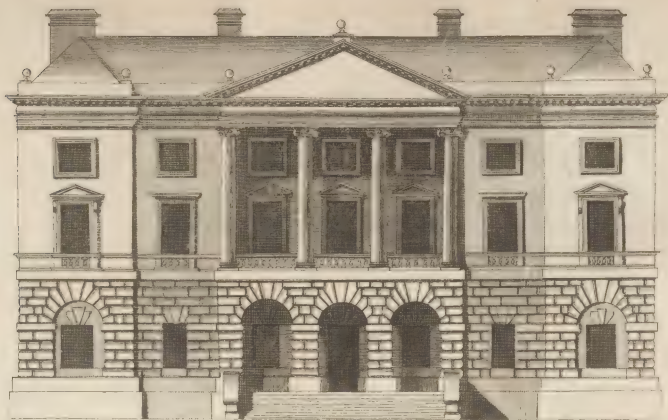


Scale of Feet.



AA are two Parlours, &c.
 B, Stair Case.
 C, Hall.
 D, Two, &c.
 E, Dining Room.
 F, Stalls.







Practice. portions of the rooms are marked in the plan; and the front, being decorated with columns of the Ionic order, will sufficiently shew in what manner any of the five orders may be induced with propriety and elegance.

CHAP. IV. Of Aquatic Buildings.

I. OF BRIDGES.

THESE are constructed either of wood or stone; of which the last are evidently the strongest and most durable, and therefore in all cases to be preferred where the expence of erecting them can be borne. The proper situation for them is easily known, and requires no explanation; the only thing to be observed is, to make them cross the stream at right angles, for the sake of the boats that pass through the arches, with the current of the river; and to prevent the continual striking of the stream against the piers, which in a long course may endanger their being damaged and destroyed in the end.

Bridges built for a communication of high roads, ought to be so strong and substantial as to be proof against all accidents that may happen, to have a free entrance for carriages, afford an easy passage to the waters, and be properly adapted for navigation, if the river admits of it. Therefore the bridge ought to be at least as long as the river is wide in the time of its greatest flood: because the sloping of the water above may cause too great a fall, which would prove dangerous to the vessels, and occasion the under graving the foundation of the piers and abutments; or, by reducing the passage of the water too much in time of a great flood, it might break through the banks of the river, and overflow the adjacent country, which would cause very great damages; or, if this should not happen, the water might rise above the arches, and endanger the bridge to be overfet, as has happened in many places.

When the length of the bridge is equal to the breadth of the river, which is commonly the case, the current is lessened by the space taken up by the piers: for which reason, this thickness should be no more than is necessary to support the arches; and it depends, as well as that of the abutments, on the width of the arches, their thickness, and the height of the piers.

The form of the arch is commonly semicircular; but when they are of any great width, they are made elliptical, because they would otherwise become too high. This has been done at the Pont Royal, at Paris, where the middle arch is 75 feet, and its height would have been 37.5 feet, instead of which it is only 24 by being made elliptical.

Another advantage of much more importance arises from the oval figure, which is, that the quantity of masonry of the arches is reduced in the same proportion as the radius of the arch is to its height. That is, if the radius is 36 feet, and the height of the arch 24, or three fourths of the radius, the quantity of masonry of the arches is likewise reduced to three-fourths; which must lessen the expence of the bridge considerably. Notwithstanding these advantages, however, the latest experiments have determined segments of circles to be preferable to curves of any other kind; and of these the semicircle is undoubtedly the best, as pressing most perpendicularly on the piers.

When the height of the piers is about six feet, and the arches are circular, experience has shewn, says Mr Belidor, that it is sufficient to make the thickness of the piers the sixth part of the width of the arch, and two feet more; that is, the thickness of the piers of an arch of 36 feet, ought to be 8 feet; those of an arch of 48 feet, to be 10.

When the arches are of a great width, the thickness of the piers may be reduced to the sixth part of that width; but the depression of the two feet is not done at once; that is, in an arch of above 48 feet, 3 inches are taken off for every 6 feet of increase of the width of the arch. For instance, the thickness of the piers supporting an arch of 72 feet wide, should be 14 feet, according to the preceding rule; but by taking off 3 inches for every 6 feet, above an arch of 48 wide, the thickness of the piers is reduced to 13 feet: consequently, by following the same rule, the thickness of the piers supporting an arch of 16 fathoms wide, will be 16 feet; all the others above that width are the sixth part of the width.

After this, Mr Belidor gives a rule for finding the thickness of the piers which support elliptic arches, and makes them stronger than the former: the abutments he makes one sixth part more than the piers of the largest arch. But it is plain, that these rules are insufficient, being merely guess-work, determined from some works that have been executed.

The thickness of the arch-stones is not to be determined by theory, nor do those authors who have written on the subject agree amongst themselves. Mr Gautier, an experienced engineer, in his works, makes the length of the arch-stones, of an arch 24 feet wide, two feet; of an arch 45, 60, 75, 90 wide, to be 3, 4, 5, 6, feet long respectively, when they are hard and durable, and somewhat longer when they are of a soft nature: on the contrary, Mr Belidor says, they ought to be always one twenty-fourth part of the width of the arch, whether the stone be hard or soft; because, if they are soft, they weigh not so much.

But that the length of the arch-stones should be but a foot in an arch of 24 feet wide, 2, 3, 4, in arches of 48, 72, 96, feet, seems incredible; because the great weight of the arches would crush them to pieces, by the pressure against one another; and therefore Mr Gautier's rule appears preferable: as he made the length of the arch-stones to increase in a slower proportion, from 10 to 45 feet wide, than in those above that width, we imagine that the latter will be sufficient for all widths, whether they are great or little: therefore we shall suppose the length of the arch-stones of 30 feet in width to be two feet, and to increase one foot in 15, that is, 3 feet in an arch of 45 feet, 4, 5, 6, in an arch of 60, 75, and 90 feet; and so the rest in the same proportion.

Practice.

Thickness of the piers.

Of the arch-stones.

Table containing the thickness of piers of bridges.

	6	9	12	15	18	21	24
10	4.574	4.918	5.163	5.350	5.492	5.611	5.698
15	5.490	5.913	6.216	6.455	6.645	6.801	7.930
30	6.386	6.816	7.225	7.513	7.746	7.935	8.102
35	7.258	7.786	8.200	8.531	8.807	9.037	9.233
40	8.404	8.691	9.149	9.513	9.835	10.101	10.328
45	9.565	9.579	10.077	10.489	10.837	11.136	11.394
50	9.805	10.454	10.987	11.435	11.817	12.146	12.434
55	10.640	11.245	11.882	12.354	12.769	13.149	13.218
60	11.400	12.110	12.718	13.281	13.723	14.109	14.314
65	12.265	13.025	13.648	14.189	14.654	15.082	15.433
70	13.114	13.869	14.517	14.949	15.373	15.681	16.400
75	14.000	14.795	15.336	15.965	16.480	16.940	17.354
80	14.747	15.543	16.234	16.842	17.381	17.864	18.298
85	15.513	16.318	17.043	17.674	18.237	18.742	19.198
90	16.373	17.201	17.920	18.578	19.157	19.679	20.152
95	17.184	17.816	18.772	19.438	20.036	20.577	21.068
100	17.991	18.848	19.610	20.291	20.905	21.466	21.976

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Explanation of
the table.

The first horizontal line expresses the height of the piers in feet, from 6 to 24 feet, each increasing by 3; the first vertical column, the width of arches from 20 to 100 feet, for every 5 feet.

The other columns express the thickness of piers in feet and decimals, according to the respective height at the head of the column, and the width of the arch against it in the first column.

Thus, for example, let the width of the arch be 60 feet, and the height of the piers 12; then the number 12.718, under 12, and against 60, expresses the thickness of the piers, that is 12 feet, and 8.6 inches: we must observe again, that the length of the key-stone is 2 feet in an arch of 30 feet wide; 3, 4, 5, 6, in an arch of 45, 60, 75, 90; that of 20 feet wide, one foot 4 inches; and the length of any other width is found by adding 4 inches for every 5 feet in width.

As this table contains the thicknesses of piers in respect to arches that are commonly used in practice, we imagined, that to carry it farther would be needless; because the difference between the thicknesses of the piers of any contiguous arches being but small, those between any two marked here, may be made equal to half the sum of the next below and above it: thus the thickness of the piers of an arch 52 or 53 feet wide is nearly equal to 10.222, half the sum of the thicknesses 9.805 and 10.64 of the arches 50 and 55 feet wide, when the height of the piers is 6 feet.

Rectangular piers are seldom used but in bridges over small rivers. In all others, they project the bridge by a triangular prism, which presents an edge to the stream, in order to divide the water more easily, and to prevent the ice from sheltering there, as well as vessels from running foul against them: that edge is terminated by the adjacent surfaces at right angles to each other at Westminster-bridge, and make an acute angle at the Pont Royal of about 60 degrees; but of late the French terminate this angle by two cylindric surfaces, whose bases are arcs of 60 degrees, in all their new bridges.

When the banks of the rivers are pretty high, the bridge is made quite level above, and all the arches of an equal width; but where they are low, or for the sake of navigation a large arch is made in the middle of the stream, then the bridge is made higher in the middle than at the ends: in this case, the slope must be made easy and gradual on both sides, so as to form above one continued curve line, otherwise it appears disagreeable to the eye. Mr Belidor will have the descent of that slope to be one twenty-fourth part of the length; but this is undoubtedly too much, as one fiftieth part of the length is quite sufficient for the descent.

The width commonly allowed to small bridges is 30 Width, &c. feet: but in large ones near great towns, these 30 feet are allowed clear for horses and carriages, besides a banquet at each side for foot passengers of 6 to 9 feet each, raised about a foot above the common road; the parapet-walls on each side are about 18 inches thick, and 4 feet high; they generally project the bridge with a cornice underneath; sometimes ballustrades of stone or iron are placed upon the parapet, as at Westminster; but this is only practised where a bridge of a great length is made near the capital of a country.

The ends of bridges open from the middle of the two large arches with two wings, making an angle of 45 degrees with the rest, in order to make their entrance more free and easy; these wings are supported by the same arches of the bridge next to them being continued in the manner of an arch, of which one pier is much longer than the other.

How the work is to be carried on.

As the laying the foundation of the piers is the most difficult part of the whole work, it is necessary we should begin with an easy case, that is, when the depth of the water does not exceed 6 or 8 feet; and then proceed to those which may happen in a greater depth of water.

One of the abutments with the adjacent piers is inclosed by a dyke called *batardeau* by the French, of a sufficient width for the work, and room for the workmen. This *batardeau* is made by driving a double row of piles, whose distance is equal to the depth of water, and the piles in each row are 3 feet from each other; they are fastened together on the outside by bonds of 6 by 4 inches: this being done, frames of about 9 feet wide are placed on the inside to receive the boards which are to form the inclosure: the two uprights of these frames are two boards of an inch and half thick, sharpened below to be driven into the ground, and fastened together by double bonds, one below, and the other above, each separated by the thickness of the uprights; these bonds serve to slide the boards between: after these frames have been driven into the ground as hard

Prs.lice.

126
Form of
piers.

127
Slope of the
bridge on
each side.

128
Width, &c.

129
Methods of
laying the
foundation.

130
By *batardeau*.

Practice.

hard as can be, then the boards themselves are likewise driven in till they reach the firm ground underneath.

Between every two piles tie-beams are fastened to the bonds of the piles, to fasten the inside wall to the outside one; these tie-beams are let into the bonds and bolted to the adjacent piles: this being done, the bottom is cleared from the loose sand and gravel, by a machine like those used by ballast-heavers; and then well prepared clay is rammed into this coffer very tight and firm, to prevent the water from oozing through.

Sometimes these inclosures are made with piles only driven close to each other; at others, the piles are notched or dove-tailed one into the other; but the most usual method is to drive piles with grooves in them, 5 or 6 feet distant from each other, and boards are let down between them.

This being done, pumps and other engines are used to draw the water out of the inclosure, so as to be quite dry; then the foundation is dug, and the stones are laid with the usual precautions, observing to keep some of the engines always standing, in order to draw out the water that may ooze through the batardeau.

The foundation being cleared, and every thing ready to begin the work; a course of stones is laid, the outside all round with the largest stretchers and headers that can be had, and the inside filled with smaller well jointed, the whole laid in terrass mortar: the facings are cramp together, and set in lead; and some cramps are also used to fasten the facings with the inside. The same manner is to be observed throughout all the courses to the height of low-water mark; after which the facings alone are laid in terrass mortar, and the inside with the best of the common fort. When the foundation is carried to the height of low-water mark, or to the height where the arches begin, then the shaft or middle wall is to be carried up nearly to the height of the arches, and there left standing till all the piers are finished, in order that the masonry may be sufficiently dry and settled before the arches are begun.

As the piers end generally with an arch at each end, it is customary to lay the foundation in the same manner: which is not so well as to continue the base rectangular quite to the ends of the piers, and as high as low-water mark; both because the foundation becomes then so much broader, and also because the water will not be able to get under it: for when the current sets against a flat surface, it drives the sand and mud against it, so as to cover it entirely; whereas if a sharp edge be presented to the stream, it carries every thing away, and exposes the foundation to the continual action of the water, which in course of time must destroy it.

After the intervals between the arches are filled up with stones laid in a regular manner without mortar, and the gravel is laid over them; two drains or gutters are to be made lengthwise over the bridge, one on each side next to the foot-path, about 6 feet wide and a foot deep; which being filled with small pebble stones, serve to carry off the rain-water that falls on the bridge, and to prevent its filtering through the joints of the arches, as often happens.

How to build in water with COFFERS.

THE former method of laying the foundation by means of batardeaux is very expensive, and often meets

with great difficulties: for when the depth of water is 8 feet or more, it is scarcely possible to make the batardeaux so tight as to prevent the water from oozing through them; and in that case the number of engines required, as well as the hands to work them, become very expensive; and if part of the batardeau should break by some extraordinary wind or tide, the workmen would be exposed to very great danger.

The next and best method therefore is to build with coffers, when it is practicable, such as were used at Westminster bridge. Here the height of water was 6 feet at a medium when lowest, and the tide rose about 10 feet at a medium also: so that the greatest depth of water was about 16 feet. At the place where one of the piers of the middle or great arch was to be, the workmen began to drive piles of about 13 or 14 inches square, and 34 feet long, shod with iron, so as to enter into the gravel with more ease, and hooped above to prevent their splitting in driving them: these piles were driven as deep as could be done, which was 13 or 14 feet below the surface of the bed of the river, and 7 feet distant from each other, parallel to the short ends of the pier, and at about 30 feet distant from them: the number of these piles was 34, and their intent to prevent any vessels or barges from approaching the work, and in order to hinder boats from passing between them, booms were placed so as to rise and fall with the water.

This being done, the ballast-men began to dig the foundation under the water, of about 6 feet deep, and 5 wider all round than the intended coffer was to be, with an easy slope to prevent the ground from falling in: in order to prevent the current from washing the sand into the pit, short grooved piles were driven before the two ends and part of the sides, not above a foot higher than low-water mark, and about 15 feet distant from the coffer: between these piles, rows of boards were let into the grooves down to the bed of the river and fixed there.

The bottom of the coffer was made of a strong grate, consisting of two rows of large timbers, the one longwise, and the other crosswise, bolted together with wooden trunnels, ten feet wider than the intended foundation. The sides of the coffer were made of fir timbers laid horizontally close one over another, pinned with oak trunnels, and framed together at the corners, excepting at the two salient angles, where they were secured with proper irons, so that the one half might be loosened from the other if it should be thought necessary; these sides were lined on the inside as well as on the outside with three-inch planks placed vertically; the thickness of those sides was 18 inches at the bottom, reduced to 15 above, and they were 16 feet high; besides, knee timbers were bolted at the angles, in order to secure them in the strongest manner. The sides were fastened to the bottom by 28 pieces of timber on the outside, and 18 within, called *straps*, about 8 inches broad, and 3 or 4 inches thick, reaching and lapping over the ends of the sides: the lower part of these straps had one side cut dove-tail fashion, in order to fit the mortises made near the edge of the bottom to receive them, and were kept in their places by iron wedges; which being drawn out when the sides were to be taken away, gave liberty to clear the straps from the mortises.

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Method of
building
Westminster bridge.

Before

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Proper
form of the
base.

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Before the coffer was launched, the foundation was examined, in order to know whether it was level; for which purpose several gauges were made, each of which consisted of a stone of about 15 inches square, and 3 thick, with a wooden pole in the middle of about 18 feet long. The foundation being levelled and the coffer fixed directly over the place with cables fastened to the adjacent piles, the masons laid the first course of the stones for the foundation within it; which being finished, a sluice made in the side was opened near the time of low-water; on which the coffer sunk to the bottom; and if it did not set level, the sluice was shut, and the water pumped out, so as to make it float till such time as the foundation was levelled: then the masons cramp the stones of the first course, and laid a second; which being likewise cramped, a third course was laid: then the sluice being opened again, proper care was taken that the coffer should settle in its due place. The stone-work being thus raised to within two feet of the common low-water mark, about two hours before low-water the sluice was shut, and the water pumped out so far as that the masons could lay the next course of stone, which they continued to do till the water was risen so high as to make it unsafe to proceed any farther: then they left off the work, and opened the sluice to let in the water. Thus they continued to work night and day at low-water, till they had carried their work some feet higher than the low-water mark: after this, the sides of the coffer were loosened from the bottom, which made them float; and then were carried ashore to be fixed to another bottom, in order to serve for the next pier.

It must be observed, that the coffer being no higher than 16 feet, which is equal to the greatest depth of water, and the foundation being 6 feet under the bed of the river; the coffer was therefore 6 feet under water when the tide was in; but being loaded with three courses of stones, and well secured with ropes fastened to the piles, it could not move from its place. By making it no higher, much labour and expence were saved; yet it answered the intent full as well as if it had been high enough to reach above the highest flood.

The pier being thus carried on above low-water mark, the masons finished the rest of it during the intervals of the tides in the usual way; and after all the piers and abutments were finished in a like manner, the arches were begun and completed as mentioned before: the whole bridge was built in about seven years, without any accidents happening either in the work or to the workmen, which is seldom the case in works of this nature.

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Materials
employed.

It may be observed, that all the piers were built with solid Portland stone, some of which weighed four tons. The arch-stones were likewise of the same sort: but the rest of the masonry was finished with Kentish rag-stones; and the paths for foot passengers were paved with *purbeck*, which is the hardest stone to be had in England, excepting Plymouth marble.

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This method
sometimes im-
practicable.

This method of building bridges is certainly the easiest and cheapest that can be thought of, but cannot be used in many cases: when the foundation is so bad as not to be depended upon without being piled, or the depth of water is very great, with a strong current and no tide, it cannot then be practised. For, if piles are to be used, it will be next to impossible to cut them off

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in the same level five or six feet below the bed of the river, notwithstanding that saws have been invented for that purpose: because if they are cut off separately, it will be a hard matter to do it so nicely that the one shall not exceed the other in height; and if this is not done, the grating or bottom of the coffer will not be equally supported, whereby the foundation becomes precarious: neither can they be cut off all together; for piles are to be driven as far as the bottom of the coffer extends, which at Westminster bridge was 27 feet; the saw must have three feet play, which makes the total length of the saw 30 feet; now if either the water is deeper than it is there, or the arches are wider, the saw must still be longer; so that this method is impracticable in any such cases.

In a great depth of water that has a strong current and no tide, the coffers must reach above the water, which makes them very expensive, and unwillingly to manage, as well as very difficult to be secured in their places, and kept steady: so that there is no probability of using them in such a case.

In some cases, when there is a great depth of water, and the bed of the river is tolerably level, or where it can be made so by any contrivance, a very strong frame of timber about four times as large as the base of the piers may be let down with stones upon it round the edges to make it sink: after fixing it level, piles must be driven about it to keep it in its place; and then the foundation may be laid in coffers as before, which are to be kept steady by means of ropes tied to the piles.

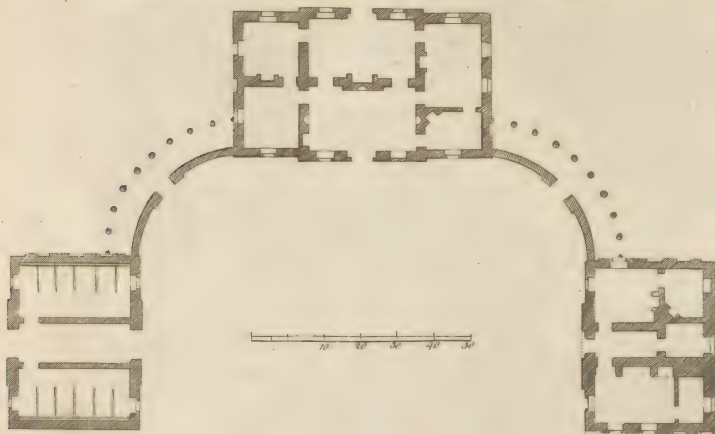
This method has frequently been used in Russia; and though the bed of the river is not very solid, yet such a grate, when once well settled with the weight of the pier upon it, will be as firm as if piles had been driven under the foundation; but to prevent the water from gulling under the foundation, and to secure it against all accidents, a row of dove-tail piles must be driven quite round the grating: this precaution being taken, the foundation will be as secure as any that can be made.

The French engineers make use of another method in raising the foundations of masonry under water; which is, to drive a row of piles round the intended place, nearer to, or farther from each other, according as the water is more deep or shallow: these piles, being strongly bound together in several places with horizontal tie-beams, serve to support a row of dove-tail piles driven within them: when this is done, and all well secured according to the nature of the situation and circumstances, they dig the foundation by means of a machine with scoops, invented for that purpose, until they come to a solid bed of gravel or clay; or if the bed of the river is of a soft consistence to a great depth, it is dug only to about 6 feet, and a grate of timber is laid upon it, which is well secured with piles driven into the opposite corners of each square, not minding whether they exceed the upper surface of the grate much or little.

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French method.

When the foundation is thus prepared, they make a kind of mortar called *beton*, which consists of twelve parts of pozzolano or Dutch terrass, six of good sand, nine of unslaked lime the best that can be had, thirteen of stone splinters not exceeding the bigness of an egg, and three parts of tile-dust, or cinders, or else scales of iron out of a forge: this being well worked together





Practice. together must be left standing for about 24 hours, or till it becomes so hard as not to be separated without a pick-ax.

This mortar being thus prepared, they throw into the coffer a bed of rubble-stone, not very large, and spread then all over the bottom as nearly level as they can; then they sink a box full of this hard mortar, broken into pieces, till it come within a little of the bottom; the box is so contrived as to be overfret or turned upside down at any depth; which being done, the pieces of mortar soften, and so fill up the vacant spaces between the stones; by these means they sink as much of it as will form a bed of about twelve inches deep all over: then they throw in another bed of stone, and continue alternately to throw one of mortar and one of stone till the work approaches near the surface of the water where it is levelled, and then the rest is finished with stones in the usual manner.

Mr Belidor says, in the second part of his hydraulics, vol. ii. p. 188, that Mr Milet de Montville having filled a coffer, containing 27 cubic feet, with masonry made of this mortar, and sunk it into the sea, it was there left standing for two months, and when it was taken out again it was harder than stone itself.

¹³⁷ *Impossibility of building bridges in some cases.* We have hitherto mentioned such situations only where the ground is of a soft nature: but where it is rocky and uneven, all the former methods prove ineffectual; nor indeed has there yet been any one proposed which can be always used upon such occasions, especially in a great depth of water. When the water is not so deep but that the unevenness of the rock can be perceived by the eye, piles strongly shod with iron may be railed and let fall down, by means of a machine, upon the higher parts, so as to break them off piece by piece, till the foundation is tolerably even, especially when the rock is not very hard; which being done either this or any other way that can be thought of, a coffer is made without any bottom, which is let down and well secured, so as not to move from its place: to make it sink, heavy stones should be fixed on the outside; then strong mortar and stones must be thrown into it; and if the foundation is once brought to a level, large hewn stones may be let down so as to lie flat and even: by these means the work may be carried on quite up to the surface of the water. But when the water is so deep, or the rock so hard as not to be levelled, the foundation must be founded, so as to get nearly the risings and fallings; then the lower part of the coffer must be cut nearly in the same manner, and the rest finished as before. It must however be observed, that we suppose a possibility of sinking a coffer; but where this cannot be done, no method that we know of will answer.

¹³⁸ *Trajan's bridge over the Danube described.* Among the aquatic buildings of the ancients none appears to have been more magnificent than Trajan's bridge. Dion Cassius gives the following account of it: "Trajan built a bridge over the Danube, which in truth one cannot sufficiently admire; for though all the works of Trajan are very magnificent, yet this far exceeds all the others: the piers were 20 in number, of square stone; each of them 150 feet high above the foundation, 60 feet in breadth, and distant from one another 170 feet. Though the expence of this work must have been exceeding great, yet it becomes more extraordinary by the river's being very rapid, and its

bottom of a soft nature: where the bridge was built, was the narrowest part of the river thereabout, for in most others it is double or treble this breadth; and although on this account it became so much the deeper and the more rapid, yet no other place was so suitable for this undertaking. The arches were afterwards broken down by Adrian; but the piers are still remaining, which seem as it were to testify that there is nothing which human ingenuity is not able to effect." The whole length then of this bridge was 1590 yards; some authors add, that it was built in one summer, and that Apollodorus of Damascus was the architect, who left behind him a description of this great work.

¹³⁹ *Where stone bridges cannot be erected on account of the expence, very strong and durable ones may be constructed of wood: in which case, they ought to be so framed, as that all the parts may press upon one another like the arch of a stone bridge; and thus, instead of being weakened by great weights passing over them, they will become the stronger. How this is to be accomplished, will be better understood from* ¹⁴⁰ *Plate XXXIX. fig. 3. which represents a wooden bridge constructed after this manner, than it can be by any description.* *Wooden bridges.*

2. Of HARBOURS.

¹⁴⁰ *Situation proper for harbours.* In these, the first thing to be considered is the situation; which may be some large creek or basin of water, in or near the place where the harbour is intended to be made, or at the entrance of a large river, or near the sea: for a harbour should never be dug entirely out of dry land, unless upon some extraordinary occasions, where it is impossible to do otherwise, and yet a harbour is absolutely necessary. When a proper place is found, before it is fixed upon, it must be considered whether ships can lie there safe in stormy weather, especially when those winds blow which are most dangerous upon that coast; whether there be any hills, rising ground, or high buildings, that will cover it; in these cases, the situation is very proper: but if there be nothing already that will cover the ships, it must be observed whether any covering can be made at a moderate expence, otherwise it would be useless to build a harbour there.

The next thing to be considered is, whether there be a sufficient depth of water for large ships to enter with safety, and lie there without touching the ground; and if not, whether the entrance and inside might not be made deeper at a moderate expence: or, in case a sufficient depth of water is not to be had for large ships, whether the harbour would not be useful for small merchantment; for such a one is often of great advantage, when situated upon a coast much frequented by small coasting vessels.

The form of the harbour must be determined in such a manner, that the ships which come in when it is stormy weather may lie safe, and so as there may be sufficient room for as many as pass that way: the depths of water where the piers are to be built must be taken at every 10, 15, or 20 feet distance, and marked upon piles driven here and there, in order that the workmen may be directed in laying the foundation.

¹⁴¹ *Materials.* This being done, it must be considered what kind of materials are to be used, whether stone, brick, or wood. When stones are to be had at a moderate price, they ought

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ought to be preferred, because the work will be much stronger, more lasting, and need fewer repairs, than if made with any other materials: but when stones are scarce, and the expence becomes greater than what is allowed for building the harbour, the foundation may be made of stone as high as low-water mark, and the rest finished with brick. If this manner of building should still be too expensive, wood must be used; that is, piles are driven as close as is thought necessary, which being fastened together by cross-bars, and covered with strong oaken planks, form a kind of coffer, which is filled with all kinds of stones, chalk, and shingles.

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French method of building.

The manner of laying the foundation in different depths of water, and in various soils, requires particular methods to be followed. When the water is very deep, the French throw in a great quantity of stones at random, so as to form a much larger base than would be required upon dry land; this they continue to within 3 or 4 feet of the surface of the water, where they lay the stones in a regular manner, till the foundation is raised above the water: they then lay a great weight of stones upon it, and let it stand during the winter to settle; as likewise to see whether it is firm, and resists the force of the waves and winds: after that, they finish the superstructure with large stones in the usual manner.

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A preferable one.

As this method requires a great quantity of stones, it can be practised only in places where stones are in plenty; and therefore the following one is much preferable. A coffer is made with dove-tail piles of about 30 yards long, and as wide as the thickness of the foundation is to be; then the ground is dug and levelled, and the wall is built with the best mortar.

As soon as the mortar is tolerably dry, those piles at the end of the wall are drawn out, the side-rows are continued to about 30 yards farther, and the end inclosed; then the foundation is cleared, and the stones laid as before. But it must be observed, that the end of the foundation finished is left rough, in order that the part next to it may incorporate with it in a proper manner; but if it is not very dry, it will incline that way of itself, and bind with the mortar that is thrown in next to it: this method is continued till the whole pier is entirely finished.

It must likewise be observed, that the piers are not made of one continued solid wall; because in deep water it would be too expensive: for which reason, two walls are built parallel to each other, and the interval between them is filled up with shingle, chalk, and stone. As these walls are in danger of being thrust out or overset, by the corps in the middle, together with the great weight laid at times on the pier, they are tied or bound together by cross-walls at every 30 or 40 yards distance, by which they support each other in a firm and strong manner.

In a country where there is a great plenty of stones, piles may be driven in as deep as they will go, at about two or three feet distance; and when the foundation is sunk and levelled, large stones may be let down, which will bed themselves: but care must be taken to lay them close, and so as to have no two joints over each other; and when the wall is come within reach, the stones must be cramp together.

144
Another method with coffer.

Another method practised, is to build in coffers much

after the same manner as has been done in building the piers of Westminster-bridge; but as in this case the ends of the coffers are left in the wall, and prevent their joining so well as to be water-tight, the water that penetrates through and enters into the corps may occasion the wall to burst and to tumble down. Another inconvenience arising from this manner of building is, that as there are but few places without worms, which will destroy wood where-ever they can find it; by their means the water is let into the pier, and consequently makes the work liable to the same accident as has been mentioned above.

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To prevent these inconveniences, the best method is, to take the wood away, and joggle the ends of the walls together with large stones, pouring terrais-mortar into the joints; when this is done, the water between the two walls may be pumped out, and the void space filled up with stone and shingle as usual: or if these joggles cannot be made water-tight, some dove-tail piles must be driven at each end as close to the wall as can be done, and a strong fail-cloth put on the outside of them, which, when the water is pumped out, will stick so close to the piles and wall, that no water can come in. This method is commonly used in Russia.

146
Thickness of piers.

The thickness of a pier depends on two considerations: it ought to be both such as may be able to resist the shock of the waves in stormy weather; and also to be of a sufficient breadth above, that ships may be laden or unladen whenever it is thought necessary. Now, because the specific gravity of sea-water is about one half that of brick, and as 2 to 5 in comparison of stone; and since the pressure of stagnated water against any surface is equal to the weight of a prism of water whose altitude is the length of that surface, and whose base is a right angled isosceles triangle, each of the equal sides being equal to the depth of the water; therefore a pier built with bricks, whose thickness is equal to the depth of the water, will weigh about four times as much as the pressure of the water against it; and one of stone of the same breadth, about 6 times and a quarter as much. Now this is not the force to be considered, since this pressure is the same within as without the pier: but it is that force with which the waves strike against the piers, and that depends on the weight and velocity of the waves, which can hardly be determined; because they vary according to the different depths of water, the distance from the shore, and according to the tides, winds, and other causes. Consequently the proper thickness of the piers cannot be determined by any other means than by experience.

Practitioners suppose, that if the thickness of a pier is equal to the depth of the water, it is sufficient; but for a greater security they allow 2, 3, or 4 feet more. This might probably do, if piers were built with solid stones cramp together; but as this is hardly ever the case, and on the contrary, as the inside is filled up with shingle, chalk, or other loose materials, their rule is not to be depended upon: besides it makes the space above too narrow for lading and unlading the ships, unless in a great depth of water; so that it does not appear that their method can be followed, excepting in a very few cases where the water has but very little motion.

When stone can be had, no other materials should be used, because they being of a larger bulk than brick, will

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will better resist the waves by their own weight, till such time as the mortar is grown hard; for after this is effected, brick will resist better against the action of sea-water than soft stones.

The wall must be built with terrass mortar from the bottom to the height of low-water mark, and the rest finished with cinder or tile-dust mortar, which has been found sufficiently good in those places where the wall is wet and dry alternately. The upper part of the pier should be paved with flat hewn stones laid in strong mortar, in order to prevent any water from penetrating into it: iron rings ought also to be fixed here and there at proper distances, to fasten the ships, and prevent them from striking against the pier when agitated by the waves.

Wooden fenders or piles should be driven at the inside close to the wall, and cramp to it with iron, to prevent the ships from touching them, and from being worn by the continual motion. Where the sea breaks against the piers with great violence, breakers should be made at proper distances; that is, two rows of piles are driven nearly at right angles to the piers for the length of about 12 or 15 feet, and at about 8 or 10 feet distant from each other; and then another to join the two former: these piles being covered with planks, and the inside being filled with shingle and rubble-stones, then the top is paved with stones of about a foot in length, set long-wise to prevent the waves from tearing them up. This precaution is absolutely necessary where the water rushes in very strongly.

A R C

A R C

Military ARCHITECTURE, the same with what is otherwise called *fortification*. See *FORTIFICATION*.

Naval ARCHITECTURE, the art of building ships *. *ARCHITALASSUS*, or admiral-shell, a synonyme of a species of voluta. See *VOLUTA*.

ARCHITRAVE, in architecture, that part of a column which lies immediately upon the capital, being the lowest member of the entablature *.

Over a chimney, this member is called the *mantle-piece*; and over doors or windows, the *hyperthyron*.

ARCHIVAULT, in architecture, implies the inner contour of an arch, or a band adorned with mouldings, running over the faces of the arch-stones, and bearing upon the impostis. It has only a single face in the Tuscan order, two faces crowned in the Doric and Ionic, and the same mouldings as the architrave in the Corinthian and Composite.

ARCHIVE, or *ARCHIVES*, an apartment in which are deposited the records, charters, and other papers of a state or community.

ARCHMARSHAL, the grand marshal of the empire, a dignity belonging to the elector of Saxony.

ARCHONS, in Grecian antiquity, were magistrates appointed after the death of Codrus *. They were chosen from the most illustrious families, till the time of Aristides, who got a law passed, by which it was enacted, that, in electing these magistrates, less regard should be paid to birth than to merit.

The tribunal of the archons was composed of nine officers. The first was properly the *archon*; by whose name the year of his administration was distinguished. The title of the second was *king*; that of the third, *poemarchus*: to these were added six *thesmophetae*. These magistrates, elected by the scrutiny of beans, were obliged to prove, before their respective tribes, that they had sprung, both in their father's and their mother's side, for three descents, from citizens of Athens. They were likewise to prove that they were attached to the worship of Apollo, the tutelary god of their country; that they had in their house an altar consecrated to Apollo; and that they had been respectfully obedient to their parents; an important and sacred part of their character, which promised that they would be faithful servants to their country. They were likewise to prove, that they had served in a military capacity the number of years which the republic required of every citizen: and this qualification gave

the state experienced officers; for they were not allowed to quit the army till they were forty years old. Their fortune too, of which they were to inform those before whom they were examined, was a warrant for their fidelity.

After the commissioners, who were appointed to inquire into their character and other requisites, had made a report of them, they were then to swear that they would maintain the laws; which obligation if they neglected, they engaged to send to Delphi a statue of the weight of their bodies. According to a law of Solon, if an archon got drunk, he was condemned to pay a heavy fine, and sometimes even punished with death. Such magistrates as the Athenian archons were well entitled to respect. Hence it was eternal infamy to insult them; and hence Demosthenes observed, that to treat the thesmothetae with disrespect, was to show disrespect to the republic.

Another qualification indispensably required of the second officer of this tribunal, who was called the *king*, was, that he had married the daughter of an Athenian citizen, and that he had espoused her a virgin. This was exacted of him, says Demosthenes, because part of his duty was to sacrifice to the gods, jointly with his wife, who, instead of appeasing, would have irritated them, if she had not possessed both those honours.

The inquiry into the private title of the nine archons was very severe; and this attention was the more necessary, as they had a right to take a seat in the Areopagus, after they had quitted their office, and given an account of their administration.

When any obscurity occurred in the laws, relative to religion and the worship of the gods, the interpretation was submitted to the tribunal of the archons.

Aristotle observes, that Solon, whose aim was to make his people happy, and who found their government in his time aristocratical, by the election of the nine archons, who were annual magistrates, tempered their power, by establishing the privilege of appealing from them to the people, called by lot to give their suffrage, after having taken the oath of the Heliasia, in a place near the panathenaeum, where Hippias had formerly calmed a sedition of the people, and bound them to peace by an oath.

The archons were the principal officers, not only in civil, but likewise in sacred matters, and especially in the mysteries of Bacchus. The archons, however,

* See Ship-building.

* See Architecture, vol. 1. chap. i. and Pl. XXVI.

* See the article *Attica*.

Archeuic
Archeuic.

who were surnamed *eponymi*, were chiefly employed in civil affairs; yet they prebided at the great feasts, and held the first rank there. Hence they are sometimes stiled *priests*.

ARCHONTICI, in church-history, a branch of Valentinians, who maintained that the world was not created by God, but by angels called *Archontes*.

ARCHTREASURER, the great treasurer of the German empire, a dignity belonging to the duke of Brunfwick, king of Great Britain.

ARCHYTAS of Tarentum, a philosopher of the Pythagorean sect, and famous for being the master of Plato, Eudoxas, and Philolaus, lived about 408 years before Christ. He was an excellent mathematician, particularly in that part of the science which regards mechanics: he is said to have made a wooden pigeon that could fly, and to be the first that brought down mathematics to common uses. He is said to be the inventor of the ten categories. He asserted, that God was the beginning, the supporter, and the end, of all things. There are two epistles preserved in Diogenes Laertius, one from Archytas to Plato, and another from Plato to Archytas. He acquired great reputation in his legislative capacity. He likewise commanded the army seven times, and was never defeated; but was at last cast away in the Adriatic Sea, and thrown upon the coast of Apulia.

ARCIS-SUR-AUBE, a small handsome town of France, in Champagne, seated on the river Aube. E. Long. 4. 15. N. Lat. 48. 40.

ARCO, a strong town and castle in the Trentin, belonging to the house of Austria. It was taken by the French in 1703, and abandoned soon after. It stands on the river Sarca, near the north extremity of the lake Garda. E. Long. 9. 55. N. Lat. 45. 52.

ARCONA, a strong town situated on the island of Rugen in the Baltic. It stood on a high promontory, with the east, north, and south sides defended by steep and lofty precipices, and the west by a wall fifty feet high, proportionably thick, and secured by a deep and broad ditch. It was, however, taken and ruined, in 1168, by Valdemar king of Denmark. One of the conditions imposed by the conqueror was, that the inhabitants should destroy a temple they had erected to St Vitis, and deliver up the vast treasure belonging to this tutelary saint. Another was, that they should pay 40 silver yokes for oxen, by way of tribute, and enter as soldiers in the Danish service when called upon.

ARCOS, a strong city of Andalusia, in Spain, seated on a high craggy rock, at the bottom of which runs the Guadeleto. Its strength lies not only in its situation, but in the works erected for its defence, and it is inaccessible on every side but one. The governor resides in an old castle, from whence there is a delightful prospect, which extends very far into the neighbouring country. W. Long. 2. 10. N. Lat. 36. 40.

ARCTIC, in astronomy, an epithet given to the north pole; and likewise to a circle of the sphere, parallel to the equator, and twenty-three degrees thirty minutes distant from the north pole.

ARCTICA, in ornithology, a synonyme of a species of larus. See **LARUS**.

ARCTIUM, BURDOCK; a genus of the polygamia æqualis order, belonging to the syngenesia class of plants.

Species, &c. Of this genus there are three species, the lappa or common burdock, the tomentum, and the perfonata. All these are troublesome weeds, so require no direction for their culture. The roots, however, last but two years; and therefore they are more easily destroyed than such weeds as have perennial roots. The tender stems of the common kind, deprived of the bark, may be boiled and eat like sparagus. When raw, they are good with oil and vinegar. Boys catch lats by throwing the prickly heads of this species up into the air. Cows and goats eat this herb; sheep and horses refuse it; swine are not fond of it.—This species is also used medicinally. The seeds have a bitterish subacid taste: they are recommended as very efficacious diuretics, given either in the form of emulsion, or in powder to the quantity of a dram. The roots taste sweetish, with a slight austerity and bitterness; they are esteemed aperient, diuretic, and sudorific; and said to act without irritation, so as to be safely ventured upon in acute disorders *.

ARCTOTIS, a genus of the polygamia necessaria order, belonging to the syngenesia class of plants. It is commonly called *anemosperrum*, from the resemblance of its seeds to those of the anemone.

Species. Of this genus there are 11 species, all of them natives of Ethiopia, or the Cape of Good Hope. Of these the angulifolia, with spear-shaped leaves, and the aspera, with wing-shaped woolly leaves, are most remarkable for their beauty, having rays of a fine yellow or deep gold colour. They flower in May and June.

Culture. All the species of arctotis may be propagated by cuttings; which should be frequently renewed, as the old plants are subject to decay in winter. They may be planted in any of the summer months, in a bed of light fresh earth; observing to shade them from the sun, until they have taken root. They may then be planted in pots filled with earth of the same kind, setting them in a shady place until the plants are settled in their new earth; after which, they should be exposed to the open air until the latter end of October, or longer, if the weather is favourable, when they must be removed into the green house. They will require to be shifted into other pots, at least two or three times every summer; and the pots should be frequently removed, to prevent the plants from striking their roots through the holes.

ARCTURUS, in astronomy, a fixed star of the first magnitude in the constellation Arctophylax, or Bootes. See **BOOTES**.

Arcturus rises on the first day of September, and sets on the thirteenth day of May; and has been supposed rarely to appear without bringing some storm.

ARCUATION, in gardening, the method of raising trees by layers, which is done in the following manner:

Strong mother-plants or stools must be planted in a clear border, and in a straight line, about six feet asunder. When these have shot five or six main branches from the root, and as many collateral branches, the former must be bent to the ground, and there fastened. The small branches must be covered three inches deep upon the joints, and have a large basin of earth made round them to hold the water.

About the middle of September, they may be opened,

Archeuic
Archeuic.

* See *Notes*
ria Medica,
no 101.



Plate XL.

*Fig. 1. ARDEA AMERICANA,
or Sleeping Crane.*

*Fig. 1.
ARDEA PAVONIA,
or Crowned Crane.*



J. Bell Sculp.

Arcutio
Ardea.

Ardea.

ed, and, if they have taken root, may be immediately removed into the nursery; but if they have not sufficiently extended their roots, they must be suffered to remain till the spring, and then transplanted.

ARCUTIO, a machine consisting of hoops, used in Florence by nurses, in order to prevent the child from being overlaid. Every nurse is obliged to lay her child in an arcutio, under the pain of excommunication.

ARDAMON, or ARDAMA, in antiquity, a vessel of water placed at the door of a person deceased, till the time of burial, as a token that the family was in mourning, and to serve to sprinkle and purify persons as they came out of the house.

ARDASSES, the coarsest of all the silks in Persia.

ARDEA, in ornithology, a genus of the order of grallæ. The general characters of this order are these: The bill is straight, sharp, long, and somewhat compressed, with a furrow that runs from the nostrils towards the point; the nostrils are linear; and the feet have four toes. Under this genus Linnæus comprehends the grus or crane, the ciconia or stork, and the ardea or heron, of other authors.

Plate XL.
fig. 1.

The first species is the pavonia, or crowned crane, which has an erect bristly crest, with the temples and two wattles naked. The head is black; the crest is yellowish, and tipped with black at the top; the wings are white; and the feathers of the tail black, and of an equal length. It is a native of Africa.

2. The grus, or common crane of English authors, has a naked papillous crown; the prime feathers of the wings are black; the body is ash-coloured; the prime feathers of the tail are ragged. It is a native of Europe and Africa. It winters in Lithuania and Podolia: *Trans Pontum fugat, et terris immittit apricis*. Virg. This bird commonly rests upon one foot.—This species seems to have been formerly a native of Britain; as we find in Willoughby, page 52. that there was a penalty of twenty pence for destroying an egg of this bird; and Mr Ray informs us, that in his time they were found during the winter in large flocks in Lincolnshire and Cambridgeshire: but at present the inhabitants of those counties are scarcely acquainted with them; so that these birds seem now to have forsaken our island.

Fig. 2.

3. The Americana, or hooping crane of Edwards, is a native of America: The crown of the head and temples are naked and papillous; the forehead, nape of the neck, and prime wing-feathers, are black; but the body is white: The under part of the head, as far as the lower chap, is red; the beak is yellowish, and jagged at the point; the feet are red, and the prime tail-feathers white. Early in the spring great multitudes of them frequent the lower parts of the rivers near the sea, and return to the mountains in the summer. They make a remarkable hooping noise.

4. The ciconia, or white stork of Ray, has naked eye-balls, and black prime wing-feathers. The skin below the feathers, as also the beak, feet, and claws, are of a blood-colour. It is a native of Europe, Asia, and Africa; but is seldom or never to be met with in Italy. The ciconia feeds upon amphibious animals. It is such an enemy to serpents, that it is reckoned almost a crime to kill a stork. From this favourable treatment, they are seen in Holland and the Low Countries walk-

ing unconcerned in the middle of the flocks. Storks are birds of passage; they spend the summer in Europe, and disappear all at once, and go off to Egypt, Ethiopia, &c. before winter, and do not return till about the middle of March.

5. The major, or common heron, has a black crest depending from the back part of the head, an ash-coloured body, and a black line and belt on the neck and breast. It is a native of Europe. This bird is remarkably light in proportion to its bulk, scarce weighing three pounds and a half: the length is three feet two inches; the breadth five feet four inches. The body is very small, and always lean; and the skin scarce thicker than what is called *gold-beater's skin*. It must be capable of bearing a long abstinence, as its food, which is fish and frogs, cannot be readily got at all times. It commits great devastation in our ponds; but being unprovided with webs to swim, nature has furnished it with very long legs to wade after its prey. It perches and builds in trees, and sometimes in high cliffs over the sea, commonly in company with others, like rooks. It makes its nest of sticks, lines it with wool; and lays five or six large eggs of a pale green colour. During incubation, the male passes much of its time perched by the female. They desert their nests during the winter, excepting in February, when they resort to repair them. It was formerly in this island a bird of game, heron-hawking being so favourite a diversion of our ancestors, that laws were enacted for the preservation of the species, and the person who destroyed their eggs was liable to a penalty of twenty shillings for each offence. Not to know the hawk from the heron-flaw was an old proverb*, taken originally from this diversion; but in course of time served to express great ignorance in any science. This bird was formerly much esteemed as a food; made a favourite dish at great tables, and was valued at the same rate as a pheasant. It is said to be very long-lived: by Mr Keyser's account it may exceed 60 years†; and by a recent instance of one that was taken in Holland by a hawk belonging to the Stadtholder, its longevity is again confirmed, the bird having a silver plate fastened to one leg, with an inscription, importing it had been before struck by the elector of Cologne's hawks in 1735.—The cinerea of Linnæus is the female of this species.

6. The garzetta, or egret, is crested behind; the body is white, the beak black, and the feet greenish. It is a most elegant bird. It weighs about one pound; and the length is 24 inches, to the end of the legs‡. It is a native of the east. But that formerly it was very frequent in Britain, appears by some of the old bills of fare: in the famous feast of Archbishop Neville, we find no less than a thousand afterwards‡, egrets or cgrittes, as it is differently spelt. Perhaps the esteem they were in as a delicacy during those days occasioned their extirpation in our islands; abroad they are still common, especially in the southern parts of Europe, where they appear in flocks. The scapulars and the crest were formerly much esteemed as ornaments for caps and head-pieces; so that aigrette and egret came to signify any ornament to a cap, though originally the word was derived from *aigre, a cause de l'aigreur de sa voix**.

7. The herodias, or cristata maxima of Catesby, is crested behind, has a dusky-coloured back, reddish thighs, and the breast speckled with oblong black spots.

* In after times this proverb was absurdly corrupted to, He does not know a hawk from a hand-saw.
† Keyser's Travels, vol. I. p. 70.

‡ Godwin de Prajod, Angl. com. Leland's Collect.

* Belon xv. 195.

Pl. XLII. fig. 1.

Ardea
||
Ardebil.

It is four feet and a half when erect; the bill is about eight inches from the angle of the mouth to the end of it; and the crest is made up of long, narrow, brown feathers, the longest being five inches in length, which it can erect and let fall at pleasure. It is a native of Virginia, and feeds not only upon fish and frogs, but on lizards, efts, &c.

7. The *stellaris*, or bittern, has a smooth head; it is variegated through the whole body with dark-coloured spots of different figures and sizes. It is a native of Europe, and inhabits chiefly the fen-countries. It is met with skulking among the reeds and sedge; and its usual posture is with the head and neck erect, and the beak pointed directly upwards. It will suffer persons to come very near it without rising; and has been known to strike at boys and at sportsmen, when wounded and unable to make its escape. It flies principally about the dusk of the evening, and then rises in a very singular manner, by a spiral ascent, till it is quite out of sight. It makes a very strange noise when it is among the reeds, and a different and very singular one as it rises on the wing in the night. It builds its nest with the leaves of water-plants on some dry clump among the reeds, and lays five or six eggs of a cinerous green colour. This bird and the heron are very apt to strike at the fowler's eyes, when only maimed. The food of the bittern is chiefly frogs; not that it rejects fish, for small trouts have been met with in their stomachs. In the reign of Henry VIII. it was held in much esteem at our tables; and valued at one shilling. Its flesh has much the flavour of a hare, and nothing of the fishiness of that of the heron.

8. The *violacea*, or crested bittern of Cateby, has a white crest; the body is variegated with black and white, and bluish below. These birds are seen in Carolina in the rainy seasons: but in the Bahama Islands, they breed in bushes growing among the rocks in prodigious numbers, and are of great use to the inhabitants there; who, while these birds are young and unable to fly, employ themselves in taking them for the delicacy of their food. They are, in some of these rocky islands, so numerous, that in a few hours two men will load one of their *calapatchers*, or little boats, taking them perching from off the rocks and bushes, they making no attempt to escape, tho' almost full grown. They are called by the Bahamians *crab-catchers*, crabs being what they mostly subsist on; yet they are well-tasted, and free from any rank or fishy favour.

Linnaeus enumerates 19 other species.

ARDEA, a town of Latium, the royal residence of Turnus, king of the Rutuli, (Livy); so called, either from the augury of the heron, (Hyginus); or from the excessive heat of the country, (Martial). It was a marshy, sickly situation, (Strabo, Seneca). It was built by Danaë, the mother of Perseus, (Virgil); about five miles distant from the sea, and 20 from Rome: now a hamlet. It was a Roman colony, (Livy). The inhabitants are called *Ardeater*. E. Long. 17. 49. Lat. 41. 30.

ARDEBIL, or ARDEVIL, a town of Persia, in the province of Aderbijan. It was taken and burnt by Jenghiz Khan in 1222, when most of the inhabitants were destroyed: but it has been since re-built; and is still ranked for dignity among the best cities of the

kingdom, on account of its having been the residence and burying-place of some of the Persian kings; particularly, the sepulchre of Sheik Sefi is at this place, to which the people resort in pilgrimage. He founded a place, which they call his kitchen, with a revenue sufficient to maintain a thousand poor people, and to feed them three times a day. Three or four of the largest principal streets have shops, and are planted on each side with elms and linden trees, to keep off the excessive heat of the sun; but the houses are poorly built, with bricks dried in the sun: yet most of them, that are not in the bazars or market-places, have the pleasure and convenience of a garden full of trees bearing fruit; and there are large spots in the out-parts of the town, where the houses are at a distance from each other, and the spaces between planted with trees, which render the city of a large extent. The meidan, or great square, is 300 paces long, and 150 broad, having shops all round, which, when this place was in a flourishing condition, were stored with all manner of valuable commodities.

Through the city there pass two branches of a rivulet, which have been sometimes so enlarged by the melting of the snow on the mountains, that they have been forced to make canals to divert the stream. In the reign of Sha Abbas, it broke down the dykes, and carried away a great number of houses. The city is without walls, and is seated in the midst of a large plain encompassed with mountains, the highest of which lies westward, and is always covered with snow. These render the air sometimes extremely hot, and at others intolerably cold, which occasion epidemical distempers, that carry off great numbers of people. The soil produces no fruit near the city but apples, pears, and peaches; and yet is good both for corn and pasture. The sheep are so numerous, that 100,000 have passed over the city-bridge in a day. There are here several fountains of mineral waters, which serve both for common bathing, and for the cure of various diseases; one of these is a sulphureous spring, whose exhalations render the circumambient air extremely disagreeable. There are three springs, which produce as hot water as if it was boiling, and from which waters are conveyed to the public baths in the city. About half a league from the city, on the right hand of the public road, there is a pool of standing water, which is covered all over with salt like ice. E. Long. 47. 30. N. Lat. 37. 55.

ARDEN, the common name of forests among the Celtæ, from the wildly extensive one which ranged for 500 miles in length across the country of Gaul, or covered more than half the county of Warwick in Britain, and the fites of which still retain the appellation of *Arden*, to the much smaller one of the ancient Manecien, that covered and surrounded the site of the present Manchester. Written *Arduen* by Cæsar and Tacitus in speaking of the forest in Gaul, and *Arden* by Ossian in mentioning the woods of Caledonia, it cannot be compounded of *ar* the prepositive article in Celtic, and the substantive *den*, as Baxter and Cambden assert it to be; but is formed of *ard* an adjective, and *ven* the same as *den*. The meaning of the name therefore is not, as Mr Baxter renders it, simply *the hills*, or even, as the ingenious translator of Ossian interprets it, *the high hill*. *Ar* signifies either *high* or *great*, and *ven* or *den* either *a hill* or *wood*. *Arduen*, *Arden*,

Ardebil.
Arden.

Ardenburg *Arduen*, or *Arden*, then, means a considerable wood. Hence, only, the name became applicable to such very different sites, as the *plains* of Warwickshire and the *hills* of Scotland: and it was given, not only to the most extensive forests, to that which was the greatest in Gaul *, or fo considerable in Britain; but to many that were important only within their own contracted districts, as the wood of Mancenion abovementioned, and others. See MANCHESTER.

ARDENBURG, a town of the Netherlands, in Dutch Flanders, and formerly the most considerable in that country; but has been dismantled by the Dutch. E. Long. 3. 30. N. Lat. 51. 16.

ARDENNE, a forest in France, formerly of vast extent; but the trees are in many places grubbed up, and where they stood are built cities, towns, and abbeyes. At present it extends from Thionville, near the country of Liege, to Donchery and Sedan, on the confines of Champagne. The roads are so narrow in some places, that two waggons cannot pass each other; and therefore the waggons are obliged to provide themselves with bells or horns to give one another notice to stop in time.

ARDENTES, in middle age writers, an appellation given to those afflicted with the Ignis Sacer, or Erylipelas. They were thus called, as seeming to be scorched or burnt with the disease. Hence also the abbey of St Genevieve at Paris is called *Domus Ardentium*, by reason, as it is said, that great numbers were cured of that distemper at the shrine of this saint, in the reign of Lewis VI.

ARDES, a town of France, in Lower Auvergne, and the principal place of the duchy of Mercœur. It serves as a mart for the commodities and trade between Upper and Lower Auvergne. E. Long. 3. 10. N. Lat. 45. 22.

ARDRAH, a small territory or kingdom of Africa, in Guinea properly so called. It lies at the bottom of the gulph of St Thomas, and has a town called *Ardris*, supposed to be the capital. The inhabitants are very licentious, and have neither temple, nor any place for religious worship. However, they are very courageous; and their king was absolute till lately that the king of Dahomay made war upon this and the neighbouring territories, brought them under subjection, and burnt the towns, particularly Ardris. The air is very unwholesome to Europeans; yet the natives live to a great age; but the small-pox makes great destruction among them. This country is fertile in Indian corn, palm-tree, plants, and fruits, which last all the year; and they make a great deal of salt.

ARDRES, a small but strong town of France, in Lower Picardy. Here was an interview between Francis I. and Henry VIII. king of England in 1520. It is seated in the midst of a morass. E. Long. 2. 0. N. Lat. 50. 35.

ARDS, barony of, in the county of Down in Ireland: it is a narrow slip of land, in some places three, and in none above six miles broad; but the soil is for the most part tolerably good. It lies between the lake of Strangford and the sea, and in the fourth part it is opposite to Lecale. Sir Thomas Smith obtained a patent for this barony from Queen Elizabeth, and sent his natural son with a colony to possess it; but he was intercepted and slain by an Irishman. After Sir Tho-

mas's death, Ards was granted by James I. to some of the Scots nobility.

ARDUBA, an ancient city of the Pannonians. It was taken by Germanicus about the 7th year of the Christian æra; but its reduction was more owing to the disagreement that reigned among the inhabitants, than to the valour of the Romans. The greater part of the citizens were for submitting; but the women, more fond of their ancient laws and liberties than the men, joined some Roman deserters, and, falling upon their husbands, killed a great number of them: but being at last overcome by the men, who then submitted to the Romans, the women either threw themselves headlong from the tops of the walls, or, setting fire to their houses, burnt themselves and their children to death.

AREA, in geometry, denotes the superficial content of any figure. See GEOMETRY.

AREBO, or AREBON, a town on the slave-coast of Guinea, in Africa, seated at the mouth of the river Formosa. The English had once a factory there, as the Dutch have still. It is a large oblong place, indifferently well peopled, and furnished with houses built of reeds and leaves. E. Long. 5. 5. N. Lat. 5. 0.

ARECA, in botany, a genus of the order of palmæ pennatifoliæ. The male has no calix, but three petals, and nine stamina; the female has no calix; the corolla has three petals, and the calix is imbricated. There is only one species, viz. the cathecus, a native of India. This has no branches, but its leaves are very beautiful: they form a round tuft at the top of the trunk, which is as straight as an arrow. It grows to the height of 25 or 35 feet, and is a great ornament in gardens. The shell, which contains the fruit, is smooth without, but rough and hairy within, in which it pretty much resembles the shell of the cocoa-nut. Its size is equal to that of a pretty large walnut. Its kernel is as big as a nutmeg, to which it bears a great resemblance without, and has also the same whitish veins within when cut in two. In the centre of the fruit, when it is soft, is contained a greyish and almost liquid substance, which grows hard in proportion as it ripens. The fruit when ripe is astringent, but not unpalatable, and the shell is yellowish. Of this fruit there is a prodigious consumption in the East Indies, there being scarce any person, from the richest to the poorest, who does not make use of it; and the trade they drive in it is incredible. The chief use that is made of areca is to chew it with the leaves of betel, mixing with it lime made of sea-shells *. In order to chew it, they cut the areca into four quarters, and take one quarter of it, which they wrap up in a leaf of betel, over which they lay a little of the lime; afterwards they tie it, by twisting it round. This bit prepared for mastication, is called *pinang*; which is a Malayan word, used all over the East Indies. The *pinang* provokes spitting very much, whether it be made with dried or fresh areca; the spittle is red, which colour the areca gives it. This mastication cools the mouth, and fastens the teeth and gums. When they have done chewing the *pinang*, they spit out the gross substance that remains in the mouth. They are under a mistake who imagine that fresh areca melts entirely in the mouth. Nor is it a less mistake to think that the teeth which are tinged red during the time of chewing, always retain that colour. As soon as they have done chewing the *pinang*, they wash their mouth

* Cornelius le Brun asserts that they rub the leaves of betel with a red drug of Siam or with white chalk.

Arelate
Arenbourg

with fresh water, and then their teeth are white again. The Europeans who live at Batavia, or Malacca, and in the Sunda and Molucca islands, use pinang as much as the Indians do; and by washing their teeth they preferve them white. Some pretend that areca strengthens the stomach, when the juice of it is swallowed, as most of the Indians do. Another property ascribed to it is, its curing or carrying off all that might be unwholesome or corrupt in the gums. When eaten by itself, as is sometimes done by the Indians, it impoverishes the blood, and causes the jaundice; but is not attended with these inconveniences when mixed in the usual way with betel.

The Samefe call it *plou* in their language. The best areca of the Indies comes from the island of Ceylon. The Dutch East-India company send a great deal of it in their ships into the kingdom of Bengal. There grows in Malabar a fort of red areca, which is very proper for dying in that colour. The same company send some of it from time to time to Surat and Amadabat, for the use of the dyers in the dominions of the Grand Mogul.

ARELÂTE, or ARELATUM, is a town of Gallia Narbonensis, situated on the Rhone, denoting a town on, or beyond, a marsh, according to the particular situation of the speaker; called *Arelate Sextanorum*, (Pliny, Mela, Coin), because it had a colony of the sixth legion. Writers of the lower age call it *Arelas, atis*, (Prudentius, Aufonius). There was a double Arelas, one on each side of the river and joined by a bridge, (Aufonius); that on the left side is thought to have been built by Constantine. Tiberius's father was sent by Julius Cæsar at the head of the colony, (Suetonius); and hence the appellation *Julia Paterna*, as appears from an inscription. It was the favourite place of the Romans, and greatly ornamented; and hence called *Gallula Roma*, (Aufonius). It is now called *Arles*. * E. Long. 5. 5. Lat. 43. 40.

* See *Arles*.

AREMBERG, a small town of Germany, in the circle of Westphalia, defended by a castle. It is the capital of a county of the same name, and was erected into a principality by the emperor Maximilian II. in favour of John de Ligne, lord of Barbazon, who took the name of Aremberg. It is seated on the river Ayr. E. Long. 7. 3. N. Lat. 50. 27.

ARENA, in Roman antiquity, a place where the gladiators fought; so called from its being always strewed with sand, to conceal from the view of the people the blood spilt in the combat.

ARENARIÏ, in antiquity, gladiators who combated with beasts in the arena, or amphitheatre. The arenarii were slaves of the lowest rank; so that, though manumitted, they were not capable of being Roman citizens. They were the same with what were otherwise called *Besfiarii*.

ARENARIUM, in ecclesiastical writers, denotes a cemetery or burying-ground. The arenaria were properly a kind of pits, or holes, under ground, wherein the ancient Christians not only buried their dead, but held their religious assemblies in times of persecution.

ARENSBERG, a small town of Germany, in the circle of Westphalia, upon the river Roer. E. Long. 8. 20. N. Lat. 51. 25.

ARENSBOURG, an episcopal and maritime town of Livonia in Sweden, seated in the isle of Oïel, in the

Baltic Sea. E. Long. 22. 40. N. Lat. 58. 15.

AREOLA, among anatomists, the coloured circle surrounding the nipple of the breast.

AREOPAGUS, a sovereign tribunal at Athens, famous for the justice and impartiality of its decrees, to which the gods themselves are said to have submitted their differences. It was in the town, on a rock or hill opposite to the citadel*. The word signifies strictly, *rock of Mars*.

* See the article *Atheni*!

Plutarch attributes the establishment of the Areopagus to Solon. Other authors think differently: and with good reason; for it appears undeniable, that this tribunal was instituted before Solon. But the best authorities allow him the honour of its restoration. The city of Athens, governed till this time by tribunals of a circumscribed jurisdiction, which were multiplied by the most trifling accidents and circumstances, took no fixed political or civil form, however closely united the members of those tribunals were by their general views towards the public good and by the common love of their country. As each of those tribunals could only act in proportion to the power delegated to it, it was impossible that so many different and unequal impressions should give to the great machine of the state that uniform and regular movement which, by an impulse always the same, would keep each part in the situation it should maintain with relation to the whole.

To effect this universal and harmonious power, it was necessary to unite the different channels of public authority, which, by being too much distributed, lost its force. This authority Solon collected, and placed it all in the court of Areopagus, which consequently became the main spring of the government. The judges of this court, who, under Draco, decided only in cases of murder, now took cognizance of crimes of every kind; and the same tribunal which inflicted capital punishment on murder, poisoning, burning of houses, theft, &c. struck at the roots of those crimes, by arraigning idleness, luxury, and debauchery. Equally attentive to stimulate the indolence of the young, and the languor of the old, these sage judges roused in the one the laudable ambition to serve the state, and restored to the others their former activity. Satisfied that extremes produce the same effects, they thought the republic had as much to fear from the excess of wealth as from the gripe of poverty. Hence they exacted a minute account of the effects of every individual. Hence their great severity to those idle citizens who, instead of being useful members in a state, are its bane and its dishonour. Iocrates draws a most beautiful and striking picture of those venerable and astonishing men, and of the order and harmony which flourished in Athens by their wise administration.

The judges of the Areopagus, says that author, were more industrious to prevent crimes, by representing them in an odious light, than to establish modes of punishment. It was their opinion, that the enemies of the state were the instruments destined by the gods to punish the wicked; but that it was their province to correct and reform public and private manners. They were vigilantly attentive to the conduct of all the citizens, but particularly to that of the youth. They well knew that the impetuosity of juvenile passion gave the most violent shocks to health and growing virtue; that it was the duty of inspectors of education to soften the austerity

Areola,
Areopagus.

Areopagus. austerity of moral discipline with innocent pleasure; and that no recreations were more eligible than bodily exercises, which enable a young man to give a good education its full play, which improve health, give a pleasurable and agreeable vivacity, and even fortify the mind. The fortunes of the Athenians were too unequal to admit the same mode of education; and therefore the youth were trained in a manner suitable to the rank and circumstances of their respective families. Those of the inferior classes were taught agriculture and commerce; from this principle, that idleness is followed by indigence, and that indigence excites to the most daring and atrocious crimes. Having thus endeavoured, by wise precautions, to preclude the entrance of moral evil, they thought they had little to fear.

Exercises of the body, such as horsemanship and hunting, were objects of education to the youth of liberal fortune. In this wise distribution, their great aim was to prevent the poor from committing crimes, and to facilitate to the rich the acquisition of virtue. Not satisfied with having established good laws, they were extremely careful to see that they were observed. With this view, they had divided the city into quarters, and the country into cantons. Thus every thing passed under their eyes; nothing escaped them; they were acquainted with the private conduct of every citizen. Those who had been guilty of any irregularity were cited before the magistrates, and were reprimanded, or punished in proportion to their misdemeanour.

These same Areopagites obliged the rich to relieve the poor. They repressed the intemperance of the youth by a severe discipline. Corruption in magistrates was suppressed by the punishments denounced against it; and the old men, at the sight of the employments of the young, felt themselves animated with a degree of juvenile vigour and activity.

Religion came likewise under the cognizance of the Areopagites. Plato durst never, as we are told by Justin Martyr, divulge his private opinion concerning the Deity. He had learned from the Egyptians the doctrine of Moses. It appeared to him the best, and he embraced it with ardour. But his dread of the Areopagites, who were attached to the prevailing system, would not permit him even to name the author of sentiments which opposed the common tradition.

The public edifices, the cleanliness of the streets, the pay of the soldiers, the distribution of the public money; in a word, whatever interested the republic, was under the direction of the Areopagus. The people themselves, jealous as they were of their power, did nothing without consulting this assembly, and suffered it, without a murmur, to amend their precipitate decrees. Yet this authority, however great it may seem, was subject to the laws; by them rewards and punishments were determined; and those respectable judges gave an account of the exercise of their trust to public censors, who were placed betwixt them and the people, to prevent the aristocracy from growing too powerful.

The most important qualifications were required in those who entered into the Areopagus. Solon made a law, by which they who had not been archons for a year should not be admitted members of the Areopagus. To give more force to his law, he subjected himself to it, and was only admitted on that title. This was but the first step; those annual magistrates, after

having given law to the republic, were interrogated on their administration. If their conduct was found irreproachable, they were admitted Areopagites with eulogium; but the smallest misconduct excluded them from that honour for ever. What administration was not to be expected from a tribunal so well composed? what veneration was not due to men of such rare talents and virtue? Such respect was paid them, that people presumed not to laugh in their presence; and so well established was their reputation for equity, that those whom they condemned, or dismissed without granting their petition, never complained that they had been unjustly treated.

The edifice of the Areopagus was extremely simple; and its roof, which was at first of the most common materials, remained in that state till the time of Augustus. This we learn from Vitruvius. Orestes was the first who thought of embellishing it. He raised in it an altar to Minerva. He likewise adorned it with two seats of solid silver; on one of which the *accuser* sat, and the *accused* on the other. The one seat was consecrated to *Injury*, and the other to *Impudence*. This religious sketch was brought to perfection by Epimenides, who erected altars to those allegorical deities, and soon after a temple, which Cicero mentions in his second book of laws. This temple corresponded with that which Orestes had built to the *Furies*, who brought him to Athens, and procured him the protection of Minerva. Epimenides dedicated it a second time to the *Furies*, or *severe Goddesses*, as they were termed by the Athenians. A man was thought lost without resource, and a victim to every human ill, if he enforced a perjury by invoking the sacred name of those tremendous divinities.

Those who employed their thoughts in solving the mysteries of Paganism, imagined that the Eumenides had their temple so near the court Areopagus, that they might enlighten the judges by their inspiration, and, by their continual assistance, prevent them from committing those errors to which human weakness is liable. To propitiate those terrible deities, and to procure their favour for the Areopagus, they were worshipped with great punctuality and devotion; and the senate itself appointed their priests. Demosthenes had been nominated to preside over their sacrifices; and he thought it very extraordinary, that he, to whom the republic had confided so important an office, should be publicly impeached.

It was natural to associate with the Eumenides the other deities who shared with them the sovereign empire over the dead. Epimenides placed in their temples the statues of Pluto, of Mercury, and of Tellus. They were all, according to Pausanias, of an agreeable form. Each of them was placed upon an altar, on which the citizens, or strangers, who had been acquitted by the Areopagus, made their grateful offerings.

But it was not to gratitude alone that these several deities owed all the incense that smoked upon their altars. They who had been accused before the senate, harassed with superstition, and uncertain how these deities would be affected towards them, were lavish of sacrifices to obtain their clemency, by which they hoped their judges would likewise be influenced.

The tomb of Oedipus was another of the ornaments of

Areopagus.

of the Areopagus. It was in the outward court of the Areopagus, where a barge was likewise placed, which made a part of the pomp at the public games.

Whatever homage and implicit obedience the court of Areopagus might derive from all this religious parade, the public good was always dearer to them than any lower advantages they might have drawn from the altars and temples with which they were surrounded.

The senate assembled in a hall built on the summit of a hill, which was ascended with difficulty by the old men bent with age. However, as for some time they only assembled on the three last days of each month, they bore with patience this inconvenient situation. But public affairs multiplied to such a degree, that they were obliged to add to the three former sittings, a fourth, which was held on the seventh day of the month, and which was soon succeeded by an assembly every day. Their meetings were so regular, that they were not interrupted by the most solemn festivals, till Cephisodorus was archon, who, in the third year of the 105th Olympiad, made a decree, which obliged the Areopagites to celebrate, after the example of the other courts, the Apaturian feasts, which lasted five days.

This assiduous and painful exercise of their office made the Areopagites feel all the inconvenience of the situation of their tribunal, and determined them to remove it to a part of the city, called the *Royal Portico*. It was a square, exposed to all the inclemencies of the weather. When the judges, who assembled there in profound silence, had taken their places, they were inclosed by a thread, or rather a cord, drawn around them.

They held their assemblies in the night, that their attention to public affairs might not be diverted by external objects,—and (adds Lucian) that they might only be influenced by the arguments, and not by the presence and action, of the speakers. This circumstance explains a passage in Athenæus, who tells us, that none knew the numbers nor faces of the Areopagites. The custom of administering justice in the open air was not peculiar to them. It was followed by all the other tribunals, when they tried for murder; for two reasons:—1st, That the judges, the sworn protectors of innocence, might not be hurt by being under cover with criminals, whose hands were polluted with blood. 2^{dly}, That the accuser and the accused might not be under the same roof.

When all the members of the senate were convened, a herald enjoined silence, and ordered the people to retire. As soon as they had departed, the assembly proceeded to business; and as they deemed the least preference a flagrant injustice, the causes which they were to determine were drawn by a kind of lottery; and the same chance which brought them up, distributed them to different numbers of judges, small or great, according to the importance of the several causes.

In early times, the parties themselves stated their cause in a simple manner. The eloquence of advocates was thought a dangerous talent, fit only to varnish crimes. But afterwards the Areopagus, on this point, relaxed from their severity;—at first the accused, and soon after the accusers, were permitted to engage those to make the attack and the defence, whose profession it was to exert the art of speaking, for others, with ac-

curacy and elegance.

Sextus Empiricus seems not to have sufficiently distinguished times, where he says, that the court of Areopagus did not suffer those who were to be tried at their bar to avail themselves of the abilities of others. What undoubtedly led him into that mistake, was, an inviolable custom of that tribunal, which prohibited, in pleadings, all that warm and picturesque oratory which seduces the judgment and inflames the passions. When the suffrages were collected, each person gave his in silence. They voted with a small flint, which they held betwixt the thumb and the two next fingers, and which they put into one of the two urns that stood in a corner of the hall. One stood before the other. The first was called the *urn of death*; the second, the *urn of compassion*. That of death was of brass, and was termed *proper*; that of compassion was of wood, and was termed *improper*. The judges commonly brought their flint to the assembly, and put it into the urn; but, that all the suffrages might be collected, the herald took the two urns, and presented them, one after another, to every senator, commanding him, in the name of the republic, no longer to defer his acquittal, or condemnation.

For this method of giving sentence, which was called *κρυπτός ψηφισμός*, because it kept the vote of each person undiscovered, the Thirty Tyrants, to make themselves masters of the decisions of the Areopagus, substituted another, by means of which they knew exactly the opinion of each of the judges: for they obliged them to bring their flints publicly, and lay them upon two tables placed before them, the situation of which was quite opposite to that of the urns; for the first of those tables was that of *life*, and the second that of *death*.

The first substances with which they gave their suffrages were not small pieces of the bones of a hog, as some authors assert, but sea-shells, for which pieces of brass of the same form, termed *spondylæ*, were afterwards substituted. The substances with which they voted were distinguished by their form and colour. Those which condemned were black, and perforated in the middle; the others were white, and not perforated. The precaution of piercing the black ones tends to prove, what we have already observed, that the court of Areopagus sat in the night: for what end did it serve to pierce the black shells, or flints, if the judges could have seen them and the white ones, and consequently have distinguished their colours by the assistance of the light? But as they passed sentence in the dark, it is evident that a difference besides that of colour was necessary, to know the black ones from the white. The judges were likewise permitted to multiply at pleasure the distinctions between signs, which essentially distinguished the fates of men.

After the suffrages were collected, they were taken out of the two urns, and put into a third vase of brass. They were then counted; and as the number of white or of black flints was higher or inferior, one of the judges drew with his nail a shorter or a longer line, on a tablet, with a waxen surface, on which the result of each cause was marked. The short line expressed acquittal; the long, condemnation.

With regard to the emoluments of the judges, they were as moderate as those of the advocates. The length
of

Areopagus.

Areopagus.

Areopagus.
Arequiba.

of the procefs did not enhance its expence; and when the decision of a cause was postponed till the next day, the committee were only paid an obolus on that day. Hence Mercury, in Lucian, is surpris'd that such sensible old men as the senators of Areopagus were, should sell at so low a price the trouble of ascending fo high.

As to the number of the judges which compos'd the Areopagus, some authors, attentive only to a part of Solon's regulations, by which he enacted, that for the future, none but the nine archons should be admitted members of the Areopagus, have imagined that this tribunal was fill'd anew every year, and that it never consist'd of more than nine magistrates. This opinion, and some others, are refuted by the circumstantial account which Diogenes Laertius gives us of the condemnation of Socrates. This great man had wish'd to substitute a rational hypothesis for the fabulous and extravagant system of religion which prevail'd in his time. His project, however laudable, appear'd impious in the eye of superstition. Information was laid against him before the Areopagus, and he had as many accusers as fellow-citizens. After the charges and the answers were heard, they proceeded to suffrages; the opinions were divided, but not equally, for the number of those who condemn'd him exceeded by 281 the number of those who declar'd him innocent. He made an ironical reply to this iniquitous sentence, by telling his judges, that he took it for granted, they would admit him to a maintenance in the Prytanæum. On this sarcasm, 80 of those who had vot'd in his favour forsook him, went over to the opposite party, and condemn'd him to die. Here then we have 361 judges who condemn; to whom if we add those who persist in acquitting him, the number must be very considerable.

Of all the judgments of the Areopagus, the most famous one, excepting that of Mars, was the sentence which they pass'd on Orestes. His trial, which happen'd under Demophon the 12th king of Athens, in 375 of the Attic æra, ow'd all its fame to a remarkable circumstance, that gave rise to a custom which was observ'd ever afterwards. Orestes had kill'd his mother; he was accus'd before the Areopagus, and cit'd to appear in that court. He would have lost his life in consequence of the equal division of the votes, had not Minerva, mov'd with his misfortunes, declar'd herself for those who had absolv'd him, and join'd her suffrage to theirs. Thus Orestes was sav'd. In veneration to this miracle, the Areopagites, whenever the suffrages were equally divided, decid'd in favour of the accus'd, by granting him what they term'd the *shell of Minerva*. Cephalus and Dædalus were condemn'd by the Areopagus long before the time of Orestes.

We find in ancient authors some decisions of this tribunal, which bear the strongest marks of justice, though their objects are not interesting. We shall here quote an anecdote from Annius Gellius, and Valerius Maximus, of a woman who was accus'd of having poison'd her husband and her son. She was taken, and brought before Dolabella, who was then proconsul of Asia. She was no sooner in his presence, than she own'd the fact; and add'd, that she had very good reasons for putting her husband and her son to

death.—“ I had, (said she), to my first husband, a son whom I tenderly lov'd, and whose virtues render'd him worthy of my affection. My second husband, and the son whom I bore to him, murder'd my favourite child. I thought it would have been unjust to have suffer'd those two monsters of barbarity to live. If you think, Sir, that I have committed a crime, it is your province to punish it; I certainly shall never repent of it.” This affair embarrass'd Dolabella. She was afterwards sent to the Areopagus; and that court, when they had examin'd her a long time, order'd her and her accus'r to appear before them again a hundred years after, from the first day of her trial.

We must not, however, suppose that the Areopagus always preserv'd its old reputation; for such is the constitution of human affairs, that perfection, with regard to them, is a violent, and consequently a transitory, state. Pericles, who liv'd about 100 years after Solon, to flatter the people and win them to his party, us'd his utmost efforts to weaken the authority of the Areopagus, which was then disliked by the multitude. He took from it the cognizance of many affairs which had before come under its jurisdiction; and, to forward his design of humbling it, employ'd the eloquence of Ephialtes, whose talents were formidable, and who was an avowed enemy to the great men of Athens.

The Areopagus itself seem'd to second the endeavours of a man who project'd its ruin, and by its misconduct hasten'd its fall. The old rules of the court, by which none were admitted its members but those whose unexceptionable conduct would support its majesty, seem'd too severe. They grew less delicate in their choice; and presuming that the faults with which they dispens'd, would soon be reform'd in the society of so many good examples, vice imperceptibly crept among them: corruption, at first secret and timid, grew insensibly open and daring, and made such progress, that the most shameful crimes were soon exhibit'd on the stage; and they were not copied from the low and abandon'd multitude, but from those senators, once the venerable and austere censors of idleness and of vice. Demetrius, the comic poet, wrote a piece, which he entitl'd *The Areopagites*, where he strips the mask off those hypocritical legislators, who were now equally apt to be seduced by wealth and by beauty. So much had the Athenian senate degenerat'd in the days of Isocrates, cir. 340 years before the Christian æra.

Before this tribunal St Paul was call'd to give an account of his doctrine, and convert'd Dionysius one of their number.

The end of this court of judicature is as obscure as its origin, which was deriv'd from very remote antiquity. It exist'd, with the other magistracies, in the time of Pausanias, i. e. in the 2^d century. The term of its subsequent duration is not ascertain'd; but a writer, who liv'd under the emperors Theodosius the elder and younger, in the 5th century, mentions it as extinct.

AREQUIBA, a city of Peru in South America, situat'd in W. Long. 73°. S. Lat. 17°. It is one of the most beautiful cities in all Peru, being delightfully situat'd in the valley of Quilca, 100 leagues from Lima, and 20 from the sea, with which it communicates by a fine river. The entrance into the harbour is rather shallow for ships of great burden; but when once

Ares
Arethusa.

they are entered, they may ride securely in 18 fathoms water. This city was founded in 1539, by order of Don Francisco Pizarro, in a place known likewise by the name of *Arequiba*; but its situation being found disadvantageous, the inhabitants obtained leave to remove to the place where the city now stands. The houses are built with stone, and vaulted; and, contrary to what is usual in warm countries, they are lofty, neatly furnished within, and finely decorated on the outside. The inhabitants also are exempt from many diseases common in other parts of Peru; which perhaps is owing to their keeping the streets clean by means of canals which extend to the river. The temperature of the air is extremely good; and though sometimes a slight frost is perceivable, the cold is never excessive, nor the heat troublesome, so that the surrounding fields are clothed with perpetual verdure. These natural advantages, however, are considerably allayed by its being very subject to earthquakes, by which it has already been five times laid in ruins; notwithstanding which, it is populous, and has amongst its inhabitants some of the noblest families in America.

ARES, a word of Paracelsus's, by which he would express that power of nature in the whole material world, by which species are divided into individuals.

ARETÆUS of Cappadocia, a Greek physician, of the sect of the Pneumatists, lived in the reign of Augustus, according to some; according to others, under Trajan or Adrian. He wrote several treatises in the Ionian dialect, on acute diseases, and other medicinal subjects; some of which are still extant. The best edition of his works is that of Boerhaave, in Greek and Latin, with notes, printed in 1731; that of Wigan, printed at Oxford in 1723, in folio, is also much esteemed.

ARETHUSA, in fabulous history, the daughter of Nereus and Coris, and the companion of Diana, who changed her into a fountain to deliver her from the pursuit of her lover Alpheus.

ARETHUSA, a celebrated fountain near the city of Syracuse in Sicily, famous for the quantity of its waters, and the number of fishes it contained. Many fables were invented by the ancients concerning this fountain. They had also a notion that the river Alpheus run under or through the waters of the sea, without mixing with them, from Peloponnesus to Sicily. Mr Brydone informs us, that it still continues to send forth an immense quantity of water, rising at once to the size of a river, but is entirely abandoned by the fishes it formerly contained in such plenty. At some distance from Arethusa is a fountain of fresh water which boils up very strongly in the sea, inasmuch that, after piercing the salt water, it may be sometimes taken up very little affected by it. This fountain Mr Brydone thinks the ancients were ignorant of, or they would not have failed to use it as an argument for the submarine journey of Alpheus. It is much more probable, however, that these large fountains owe their existence to Mount Etna.

ARETHUSA, in botany, a genus of the gynandria diandria class. The generic character is taken from the nectarium, which is tubular, situated at the bottom of the corolla; and the inferior labium of it is fixed to the stylus. There are four species of the arethusa, all natives of America, except the capensis, which is only found at the Cape of Good Hope.

Aretologi,
Aretin.

ARETOLOGI, in antiquity, a sort of philosophers, chiefly of the Cynic or Stoic tribe, who, having no school or disciples of their own, haunted the tables of great men, and entertained them in their banquets with disputations on virtue, vice, and other popular topics. These are sometimes also denominated *Circulatores Philosophi*. In this sense, the word is derived from the Greek *aretos*, virtue, and *logos*, discourse. Some authors chuse to derive the word from *aretos*, gratis, agreeable; and define Aretologi, by persons who strive to divert and entertain their audience with jokes and pleasant tales; which latter seems the more natural explanation.

ARETIN (Guido), famous for his musical improvements, lived in the 11th century. He was a native of Arezzo, a city in Tuscany; and having been taught the practice of music in his youth, and probably retained as a chorister in the service of the Benedictine monastery founded in that city, he became a monk professed, and a brother of the order of St Benedict.

In this retirement he seems to have devoted himself to the study of music, particularly the system of the ancients, and, above all, to reform their method of notation. The difficulties that attended the instruction of youth in the church-offices were so great, that, as he himself says, ten years were generally consumed barely in acquiring the knowledge of the plain-song; and this consideration induced him to labour after some amendment, some method that might facilitate instruction, and enable those employed in the choral office to perform the duties of it in a correct and decent manner. If we may credit those legendary accounts that are extant in old monkish manuscripts, we should believe he was assisted in his pious intention by immediate communications from heaven: some speak of the invention of the syllables as the effect of inspiration; and Guido himself seems to have been of the same opinion, by his saying it was revealed to him by the Lord; or, as some interpret his words, in a dream: but graver historians say, that being at vespers in the chapel of his monastery, it happened that one of the offices appointed for that day was the hymn * to St John,

UT queant laxis
Mira gestorum
Solus polluit

Resonare fibris
Famuli tuorum
Labiis reatum,

Sancte Joannes.

During the performance of the hymn, he remarked the iteration of the words, and the frequent returns of UT, RE, MI, FA, SOL, LA: he observed likewise a dissimilarity between the closeness of the syllable MI, and the broad open sound of FA, which he thought could not fail to impress upon the mind a lasting idea of their congruity; and immediately conceived a thought of applying these six syllables to perfect an improvement either then actually made by him, or under consideration, viz. that of converting the ancient tetrachords into hexachords.

Struck with the discovery, he retired to his study; and having perfected his system, began to introduce it into practice: the persons to whom he communicated it were the brethren of his own monastery, from whom it met with but a cold reception, which, in the epistle to his friend, he ascribes undoubtedly to its true cause, envy: however, his interest with the abbot, and his employment in the chapel, gave him an opportunity

* Composed
by Paul, a
deacon of
the church
of Aquileia,
about the
year 1170.

nity of trying the efficacy of his method on the boys who were training up for the choral service, and it exceeded the most sanguine expectation. "To the admiration of all (says cardinal Baronius), a boy thereby learnt, in a few months, what no man, though of great ingenuity, could before that attain in several years."

The fame of Guido's invention soon spread abroad, and his method of instruction was adopted by the clergy of other countries: we are told by Kircher, that Hermannus bishop of Hamburg, and Elvirichus bishop of Osnaburg, made use of it; and by the authors of the *Histoire Littéraire de la France*, that it was received in that country, and taught in all the monasteries in the kingdom. It is certain that the reputation of his great skill in music had excited in the pope a desire to see and converse with him; of which, and of his going to Rome for that purpose, and the reception he met with from the pontiff, he himself has given a circumstantial account of in the epistle hereafter mentioned.

The particulars of this relation are very curious; and as we have his own authority, there is no room to doubt the truth of it. It seems that John XX. or, as some writers compute, the 19th pope of that name, having heard of the fame of Guido's school, and conceiving a desire to see him, sent three messengers to invite him to Rome; upon their arrival, it was resolved by the brethren of the monastery that he should go thither attended by Grimaldo the abbot, and Peter the chief of the canons of the church of Arezzo. Arriving at Rome, he was presented to the holy father, and by him received with great kindness. The pope had several conversations with him, in all which he interrogated him as to his knowledge in music; and upon sight of an antiphony which Guido had brought with him, marked with the syllables agreeable to his new invention, the pope looked on it as a kind of prodigy; and ruminating on the doctrines delivered by Guido, would not stir from his seat till he had learned perfectly to sing off a verse: upon which he declared, that he could not have believed the efficacy of the method, if he had not been convinced by the experiment he had himself made of it. The pope would have detained him at Rome; but labouring under a bodily disorder, and fearing an injury to his health from the air of the place, and the heats of the summer, which was then approaching, Guido left that city upon a promise to revisit it, and explain to his holiness the principles of his new system. On his return homewards, he made a visit to the abbot of Pomposa, a town in the duchy of Ferrara, who was very earnest to have Guido settle in the monastery of that place; to which invitation it seems he yielded, being, as he says, desirous of rendering to great a monastery still more famous by his studies there.

Here it was that he composed a tract on music, intitled *Micrologus*, i. e. "a short discourse;" which he dedicated to Theodald bishop of Arezzo; and finished, as he himself at the end of it tells us, under the pontificate of John XX. and in the 34th year of his age. Vossius speaks also of another musical treatise written by him, and dedicated to the same person.

Most of the authors who have taken occasion to mention Guido, speak of the *Micrologus* as containing the sum of his doctrine: but it is in a small tract, intitled *Argumentum novi Cantus invenendi*, that his declaration of his use of the syllables, with their several

mutations, and in short his whole doctrine of solmisation, is to be found. This tract makes part of an epistle to a very dear and intimate friend of Guido, whom he addresses thus, "Beatissimo atque dulcissimo fratri Michaeli;" at whose request the tract itself seems to have been composed.

Whether Guido was the author of any other tracts, is not easy to determine. It nowhere appears that any of his works were ever printed, except that Baronius, in his *Annales Ecclesiastici*, tom. XI. p. 73, has given at length the epistle from him to his friend Michael of Pomposa, and that to Theodald bishop of Arezzo, prefixed to the *Micrologus*; and yet the writers on music speak of the *Micrologus* as of a book in the hands of every one. Martini cites several manuscripts of Guido; namely, two in the Ambrosian library at Milan, the one written about the twelfth century, the other less ancient; another among the archives of the chapter of Pistoja, a city in Tuscany; and a third in the Mediceo-Laurenziano library at Florence, of the 15th century: these are clearly the *Micrologus*. Of the epistle to Michael of Pomposa, together with the *Argumentum novi Cantus invenendi*, he mentions only one, which he says is somewhere at Ratibon. Of the several tracts abovementioned, the last excepted, a manuscript is extant in the library of Balliol-college in Oxford. Several fragments of the two first, in one volume, are also among the Harleian manuscripts now in the British Museum, No 3199; but so very much mutilated, that they afford but small satisfaction to a curious inquirer.

ARETIN (Leonard), one of the most learned men of the 15th century, was secretary to the republic of Florence, and translated from the Greek into Latin some of the Lives of Plutarch, and Aristotle's Ethics: he also composed three books of the Punic war, that may serve as a supplement to those wanting in Livy; the history of the transactions in Italy during his time; that of ancient Greece; that of the Goths; that of the republic of Florence; and many other books. He died in 1443, aged 74.

ARETIN (Francis), a man of great reading, and well acquainted with the Greek language. He translated into Latin the Commentaries of St Chrysostom upon St John, and about 20 Homilies of the same father: he also translated the Letters of Phalaris into Latin, and wrote a treatise *De balneis Puteolanis*. He studied at Sienna, about the year 1443; and afterwards taught law there with such reputation, that they called him the *Prince of Subtleties*, and his wit became a proverb. He displayed his talents chiefly in disputes, in which nobody could withstand him. He gave his opinions in law with so much confidence, as to assure those who consulted him, that they should carry their cause: nor did experience contradict him; for it was a common saying at the bar, such a cause has been condemned by Aretin, it must therefore be lost. He taught also in the university of Pisa, and in that of Ferrara. He was at Rome under the pontificate of Sixtus IV. but did not stay here long; for he soon perceived that the great hopes which he had built upon his reputation would come to nothing. This pope, however, declared he would have given him a cardinal's hat, had he not thought he should have done a public injury by depriving the youth of such an excellent professor. When old age would not permit him to go

Aretin,
Arezzo.

through the duties of his office, they dispensed with his reading of lectures, and his salary was continued. He continued, however, sometimes to mount the chair; and although his lectures had now but little spirit in them, yet he had still many hearers on account of his reputation. One day when the students were gone to some public shows, there were but 40 persons in his auditory: which so mortified him, that he threw away his book; and crying out, "Aretin shall never explain law to a few persons," retired in a passion, and would teach no more. He was severe in his temper, and never kept a servant longer than a month or two; for it was a maxim of his, "That new-hired servants always serve best." He was honoured with the title of *knight*, and spent all his life in celibacy; and his way of living was so parsimonious, that he was thereby enabled to amass a great deal of wealth. He had designed this wealth for the maintenance of a college; but he altered his resolution, and left it to his relations.

ARETIN (Peter), a native of Arezzo, who lived in the 16th century. He was famous for his satirical writings; and was so bold as to carry his invectives even against sovereigns, and from thence got the title of the *Scurge of Princes*. Francis I. the emperor Charles V. most of the princes of Italy, several cardinals, and many noblemen, courted his friendship by presents, either because they liked his compositions, or perhaps from an apprehension of falling under the lash of his satire. Aretin became thereupon so insolent, that he is said to have got a medal struck, on one side of which he is represented with these words *IL DIVINO ARETINO*; and on the reverse, sitting upon a throne, receiving the presents of princes, with these words, *I PRINCIPI TRIBUTATI DA POPOLI, TRIBUTANO IL SERVIDOR LORO*. Some imagine that he gave himself the title of *Divine*, signifying thereby that he performed the functions of a god upon earth, by the thunderbolts with which he struck the heads of the highest personages. He used to boast, that his lampoons did more service to the world than sermons; and it was said of him, that he had subjected more princes by his pen, than the greatest had ever done by their arms. Aretin wrote many irreligious and obscene pieces; such are his dialogues, which were called *Ragionamenti*. There is likewise imputed to him another very obscene performance, *De omnibus Veneris Schematibus*. "It was about the year 1525 (says Mr Chevalier *) that Julio Romano, the most famous painter of Italy, incited by the enemy of the salvation of mankind, invented drawings to engrave 20 plates: the subjects are so immodest, that I dare only name them. Peter Aretin composed sonnets for each figure. George Vasari, who relates this in his *Lives of the Painters*, says, he does not know which would be the greatest impurity, to cast one's eyes upon the drawings of Julio, or to dip into the verses of Aretin." Some say that Aretin changed his libertine principles; but however this may be, it is certain that he composed several pieces of devotion. He wrote a Paraphrase on the penitential Psalms, and another on Genesis; he wrote also the Life of the Virgin Mary, and that of St Catherine of Sienna, and of St Thomas Aquinas. He was author likewise of some comedies. He died in the year 1556, being about 65 years old.

AREZZO, a city of Italy, in Tuscany, seated in the territory of Florence, on the declivity of a hill that

overlooks the neighbouring plain, between the Citta di Castelli and Florence. It is an ancient city, and a bishop's see; and was famous for a kind of earthen ware much esteemed by the Romans. It was greatly fallen to decay when Cosmo de Medicis took it under his protection, since which it has been recovering gradually. It is famed for being the birth-place of Mecænas. E. Long. 12. 2. N. Lat. 43. 27.

ARGEA, or ARGEI, in Roman antiquity, thirty human figures, made of rushes, thrown annually by the priests or vestals into the Tiber, on the day of the ides of May.

ARGEIA, or *Argolis*, a district of Peloponnesus, situated between Arcadia to the west, the Egean Sea to the east, Laconica and the Sinus Argolicus to the south, and to the north the territory of Corinth and the Sinus Saronicus, (Livy, Ptolemy); so called from Argos the capital: now *Romania di Morea*.

ARGEII, a people of Greece, so called by the Greeks, from *Argi*, or *Argos*; *Argivi*, by the Romans: Homer seems to call the Greeks in general *Argiæi*, as also *Achai*.

ARGEMONE, PRICKLY POPPY; a genus of the monogynia order, belonging to the polyandria class of plants. Of this genus there are three species, which are common in many parts of the West Indies, and called by the Spaniards the *devil's fig*; but they are of no use, and have very little beauty.

ARGENCES, a town of France, in Lower Normandy, on the river Meance. W. Long. 0. 10. N. Lat. 49. 15.

ARGENT, the common French word for *silver*, of which metal all white fields or charges are supposed to consist. Argent of itself is used in heraldry to signify purity, innocence; beauty, and gentleness; and, according to G. Leigh, if it is compounded with

Gul.	} <i>signifies</i>	boldness;
Azu.		courtesy;
Vcr.		virtue;
Pur.		favour;
Sab.	} <i>it</i>	religion.

ARGENTAC, a town of France, in the Limosin, on the river Dordogne. E. Long. 2. 3. N. Lat. 45. 5.

ARGENTAN, a town of France, in Lower Normandy, and in the diocese of the Seez, with the title of a marquissate. It is seated on an eminence, in the middle of a fertile plain, on the banks of the river Orne, and carries on a considerable trade. E. Long. 0. 5. N. Lat. 48. 54.

ARGENTARIA, a town of ancient Gaul, thought to stand in the place where the city Colmar now stands. It is remarkable for a great victory gained by the emperor Gratian over the Lentienses, in the month of May, A. D. 378. The Romans, being but few in number, were at first overpowered, and obliged to give ground; but soon returning to the charge, they gained in the end a complete victory. Thirty thousand of the barbarians, and among the rest their king Triarius, were killed on the spot; and all the rest, except 5000, taken prisoners.

ARGENTARIA CRETA, pure white earth, found in Prussia, and much esteemed for cleaning plate.

ARGENTEUIL, a town of the isle of France, seated on the river Seine, five miles north-west of Paris. It is a very beautiful place, with fine vineyards. On the environs

Argæa
||
Argenteuil.

* Origin de
l'imprimerie
de Paris,
p. 214.

Argentiere
Argentum
Molvum.

environs are quarries of the plaster of Paris. In the Benedictine priory they pretend to have the seamless coat of Christ. E. Long. 2. 28. N. Lat. 48. 52.

ARGENTIERE, a small island in the Archipelago, near Milo. It is about 18 miles in compass; and is full of barren mountains, producing nothing but barley, cotton, and a few grapes fit only for eating. The barley and cotton are sown round the only village there is in the island. The ladies are handsome enough, have no other employment but making cotton stockings, and take up with the sailors who put into the port. The men all use the sea, and in time become good pilots. They have very little religion, are very ignorant, and of very bad morals. Justice is administered by an itinerant cadi, who is sometimes the only Mussulman in the whole island. The only article relating to natural history is the Terra Cimolia so highly esteemed by the ancients; it is a kind of white chalk, which is very heavy, without taste, and crumbles easily: they use it in washing linen. E. Long. 23. 10. N. Lat. 36. 50.

ARGENTINA, in ichthyology, a genus of fishes belonging to the order of abdominales. The generic characters are these: The teeth are in the tongue as well as the jaws; the branchiostegic membrane has eight radii or rays; the anus is near the tail; and the belly-fins consist of many rays. There are two species of argentina, viz. 1. The sphyæna has 15 rays in the fin at the anus; the air-bladder of this species is conical on both sides, and shines like silver: according to Mr Ray, false pearls are sometimes made of it. 2. The carolina has likewise 15 rays in the fin near the anus; the tail is forked, and the lateral lines are straight. It inhabits the fresh waters of Carolina.

ARGENTINUS, a deity worshipped by the ancients, as the god of silver coin; as Æsculapius, whom they made his father, was the god of brass money, which was in use before silver.

ARGENTON, a town and county of France, in the duchy of Berry, divided into two by the river Creufe. Here was formerly a castle; but it was demolished by Lewis XIV. E. Long. 1. 38. N. Lat. 40. 30.

ARGENTORA, *Argentina*, (Notitie; *Argentoratum*, (Ptolemy); *Argentorat*, (Amaian); a city of the Tribocci; one of the fifty forts built by Drusus on the Rhine, (Florus): an appellation formed by the Romans from the German, *Argen Strassen*, or *Straten*, "unsafe roads for travellers," from the marauding parties of the garrisons that infested the roads. Now *Strasbourg**, in the lower Alface, on the rivulet Ill, near the Rhine. E. Long. 7. 35. Lat. 48. 38.

ARGENTUM. See SILVER.

ARGENTUM ALBUM, in our old customs, silver coin, or pieces of bullion that anciently passed for money. By Doomday tenure, some rents to the king were paid in *argento albo*, common silver pieces of money; other rents in *libris urfi et pensati*, in metal of full weight and purity: in the next age, that rent which was paid in money, was called *blanch fearm*, and afterwards *white-rent*; and what was paid in provisions, was termed *black mail*.

ARGENTUM MUSIVUM is a mass consisting of silver-like flakes, used for the colouring of plaster-figures, and for other purposes, as pigment. It consists of an amalgam of equal parts of tin, bismuth, and mercury. It is to be mixed with white of eggs, or spirit varnish,

and then applied to the intended work, which is afterwards to be burnished.

ARGENTUM VIVUM, *Mercury*, or *Quicksilver*. See MERCURY; CHEMISTRY, n° 153, 205, 250, 414; and the references at MATERIA MEDICA, n° 121.

ARGILLA, clay, in natural history. See CLAY. ARGIPPEANS, a part of the ancient Scythian nation. The men and the women were bald, hump-backed, and had great chins. Their language was totally peculiar to themselves. Their dress was the same with that of the other Scythians. Their food was the fruit of a tree called *Pontica*, about as high as a fig-tree: it bore a kind of filbert; the kernel of which in form resembled a bean. They sucked from it a thick black liquor; and this liquor they sometimes drank with milk. The grosser part of this fruit, after it had been pressed, served them instead of animal food; for they had but few cattle, and were therefore unskilled in the care of flocks and herds. They lay in winter under trees, over which they spread a white covering; this covering they used not in the summer. None dared to offer them any injury; for they were deemed sacred. Therefore they had no arms; and were unacquainted with the art of war. They determined the differences and disputes of their neighbours; and whoever fled to them from persecution, found a safe asylum; it would have been sacrilege to hurt, to insult him in their country.

ARGIVI. See ARGILL.

ARGO, in antiquity, a ship or vessel celebrated among the poets, as being that wherein the Argonauts made their expedition.

ARGO *Navis*, or the ship, in astronomy, is the name of a constellation of fixed stars in the southern hemisphere. The number of stars is 8, in Ptolemy's catalogue; in Tycho's, 11; and in Mr Flamsteed's, 25.

ARGONAUTA, the name of a genus of shell-fish belonging to the order of vermes testacea. The shell consists of one spiral involuted valve. There are two species of argonauta, viz. The argo, with a subdentated carina, which is found in the Mediterranean and Indian oceans. This is the famous nautilus of other authors. The shell seems no thicker nor stronger than a piece of paper; and the fish that inhabits it is a sepia. It has been imagined that men first learned the method of sailing in vessels from what they saw practised by this creature. When it is to sail, it extends two of its arms on high; and between these supports a membrane, which it throws out on this occasion: this serves for its sail; and the two other arms it hangs out of the shell, to serve occasionally either as oars, or as a steeringage; but this last office is generally served by the tail. When the sea is calm, it is frequent to see numbers of these creatures diverting themselves with sailing about in this manner; but as soon as a storm rises, or any thing gives them disturbance, they draw in their legs, and take in as much water as makes them somewhat heavier than the sea-water in which they swim, and they then sink to the bottom. The manner of their voiding this abundant water, when they would rise again, is by a number of holes, of which their legs are full. 2. The cymbium, with a blunt plaited carina. This species is very small, and is found in the Mediterranean.

ARGONAUTS, in Grecian antiquity, a company of illustrious Greeks, who embarked along with Jason, in the ship Argo, on an expedition to Colchis, with a design

Argentum
Vivum
Argonauts.

* See Strasbourg.

Argos
||
Argum.

design to obtain the golden fleece *.

ARGOS, an ancient name of Peloponnesus; from Argos, one of the kings, (Homer, Strabo).

* See the article *Thessalis*. ARGOS, the capital, and an inland town, of Argolis. It had different surnames; as *Achaicum*, from the country, or an ancient people, (Homer); *Inachium*, from the river Inachus, which runs by, (Pliny); &c. It had two citadels, (Livy); the one called *Larissa*, (Strabo); the other unnamed. At the siege of this city, Pyrrhus king of Epirus was killed by a tile thrown by an old woman. Argos was 26 stadia distant from Temenium, a maritime town, and 50 to the south of Mycenæ: Now Argos. E. Long. 23. 5. Lat. 37. 30.

ARGOS HIPPIUM, the ancient name of Arpi; but *Lampe* is a still more ancient; afterwards called *Argyrippa*, and *Argippa*; built by, and the residence of, Diomedes, on the Cerbalus, (Virgil); afterwards a large and populous city, (Livy): A town of Apulia; now in ruins, and the place called *Arpe*.

ARGUIM, an island on the coast of Africa, about sixteen miles distant from Cape Blanco, situated in W. Long. 16. 30. N. Lat. 20. 20. It is scarce two miles in length; notwithstanding which, it was a bone of contention for 87 years between the Portuguese, Dutch, English, and French; and, after a variety of fortune, has at last been totally abandoned.

This island was first discovered by the Portuguese in 1444, when a fleet bound to the east touched at Arguim, and from some little trade carried on with the natives, it was imagined that a settlement there might be of some advantage to Portugal. In consequence of this opinion, a fort was erected on the island, and the Portuguese enjoyed the peaceable possession of it till 1638. At this time, the Dutch having received a minute account of the condition of the island, resolved to attack it; and accordingly landed without molestation from the garrison, which was too weak to oppose them. The Portuguese, however, defended themselves with great intrepidity, and at last surrendered upon honourable terms. The Dutch immediately set about repairing the fortifications, and securing it in the best manner they could; however, in 1665, the fort was reduced almost to an heap of rubbish by an English squadron; but as the fortifications were totally destroyed, and only a small garrison left there, it was easily retaken by the Dutch the next year. They now redoubled their diligence in strengthening the island, entering into alliance with Moorish chiefs, procuring a number of families to settle under protection of the fort, and giving extravagant prices for gums, in order to monopolize the gum-trade. By this means the gum-trade of the French Senegal company was almost entirely destroyed; upon which they fitted out a squadron, dispossessed the Dutch, and had the island finally ceded to them by the treaty of Nimeguen.

Though the Dutch now seemed to be finally expelled, they resolved not to part so easily with such a valuable settlement. Under pretence of being subjects of the Elector of Brandenburg, therefore, they erected one of the forts which had been demolished, and there maintained themselves in spite of the utmost endeavours of the French company to dispossess them. Numberless were the memorials, protests, recripts, &c. which were published on this occasion, till a new war

in 1701 put an end to them. In 1717, however, the French company having found all their remonstrances ineffectual, fitted out a new squadron; but this armament did not arrive at Arguim before Feb. 26th 1721. The Dutch defended themselves with such intrepidity and conduct as had almost baffled the utmost efforts of the French; but the latter having found means to draw off a Moorish chief from his allegiance, the Dutch were obliged to evacuate Arguim, and retire to Portendie, where they fortified themselves, determining to watch a favourable opportunity for recovering their settlement at Arguim. This was not long wanting, by means of the weakness of the garrison, and the imprudence of Duval the French director; who, having quarrelled with the Moors, was surprised, defeated, and killed by them: in consequence of which, the settlement fell again into the hands of the Dutch on the 11th of Jan. 1722. In 1723, the Dutch were attacked by another French squadron under the command of the Sieur Rigaudiere. This gentleman boasted that the fort could not hold out one day; but though he prevailed so far as to get possession of the cisterns which contained the water of the besieged, he was at last shamefully repulsed, and forced to raise the siege with precipitation. The Dutch, however, did not long enjoy the possession which they had so bravely defended; for, in 1725, their fort was entirely demolished by the French under Du Casse, and has never since been re-built by any European nation.

ARGUMENT, in rhetoric and logic, an inference drawn from premises, the truth of which is indisputable, or at least highly probable. See LOGIC.

ARGUMENT, in matters of literature, denotes also the abridgment or heads of a book, history, comedy, chapter, &c. See SYLLABUS.

ARGUS, in fabulous history, was the son of Aristor, and had 100 eyes, 50 of which were always open. Juno made choice of him to guard Io, whom Jupiter had transformed into a white heifer; but Jupiter, pitying Io for being so closely confined, sent Mercury, who, with his flute, charmed Argus to sleep, sealed up his eyes with his caduceus, and then cut off his head; when Juno, to reward his fidelity, turned him into a peacock, and placed his eyes in his tail.

ARGUS-SHELL, a species of porcelain-shell, beautifully variegated with spots, resembling in some measure those in a peacock's tail.

ARGYLE (dukes of). See CAMPBELL.

ARGYLE-SHIRE, or *Argathilia*, in Scotland, which, together with Perthshire and the Western Islands, is said to have constituted the ancient kingdom of the Scots, while the rest of Caledonia was subject to the Picts and Romans, comprehends Kintyre, Knapdale, Argyle Proper, Cowal, Lorn, with the islands of Bute and Arran. It is bounded on the south by the Irish sea, and the Frith of Clyde; on the east, by Perthshire; on the north-east, by Lochaber; and on the north-west, by several islands. The extent of it from south to north, between the Mull of Kintyre and Lochaber, amounts to 90 miles; and the breadth, in some places, including the isles, to 70. This country, like all other parts of the Highlands, affords a very wild and horrid prospect of hills, rocks, and huge mountains, piled upon each other in a stupendous and dreadful disorder; bare, bleak, and barren to the view; or at best covered with shagged heath, which appears
black

Argument
Argyleshire.

Argyleshire black and dismal to the eye, except in the summer, when it is variegated with an agreeable bloom of a purple colour. The coast of Argyle is rocky; yet indented with bays and inlets, that afford good harbours for shipping. The country is well watered by rivers, brooks, and lakes, abounding with fish; the vales and flat parts of it are cultivated for corn; the mountains feed an innumerable quantity of black cattle, which run wild among the hills in winter as well as summer; the heath and woods, of which there is a considerable number, afford shelter to deer, roebucks, and all sorts of game in great plenty: the circumference sea, with its locks, bays, and harbours, pours forth myriads of fish; but the innate wealth of the country is dug from the bowels of the mountains in iron, copper, lead, and other metals and minerals.

Argyle is the seat of a provincial synod, consisting of five presbyteries and 49 parishes; and gives the titles of duke and earl to the noble family of Campbell, the most powerful of all the Scottish nobility. The duke of Argyle is, by hereditary right, great master of the king's household in Scotland, admiral of the Western isles, general of Denoon castle, and, before the jurisdictions were abolished, enjoyed other hereditary offices, which rendered him too powerful as the subject of a limited monarchy. He still possesses many royalties; his vassals, even of the name of Campbell, are so numerous, and his influence extends so far, that he could, on occasion, bring 3 or 4000 fighting men into the field. Argyleshire is in general peopled by this clan; and affords a great number of castles and seats belonging to gentlemen who hold of the duke, and boast themselves descended from his family.

Argyle Proper is bounded by Knapdale and Cowal on the south; Lochaber on the north; Lennox and the Grampian hills on the east; and Lorne on the west. It lies between Lochfyn and Lochow; which last is a fresh-water lake, about a mile broad, but extending 24 in length, including 12 islands, on two of which there are the castles of Enconel and Glenurquhart. This lake, which gives the title of viscount to the duke of Argyle, issues in the river Aw, which, after a course of six or seven miles, enters Loch Ettiff, and this falls into the west sea, opposite to the isle of Mull: all these abound with excellent trout and salmon. For a description of the other divisions of Argyleshire, see KINTYRE, &c.

ARGYROPOEIA, among alchemists, a pretended art of transmuting or changing other metals into silver.

ARGYRUNTUM, a maritime town of Illyria, (Ptolemy, Pliny). Now Novigrad, a town of Dalmatia. E. Long. 17. 30. Lat. 44. 30.

ARHUSEN, a diocese of North Jutland in Denmark, to the south of Wiburg, about 60 miles in length, and 30 in breadth. It contains two capital cities, called *Arhusen* and *Rander*; besides several market-towns of less note, and upwards of 300 villages. Arhusen, one of the capitals, is advantageously situated on the coast of the Baltic Sea, at the mouth of the river Guda, which runs through it; and it is surrounded with forests full of game. E. Long. 10. 0. W. Lat. 56. 10.

ARIADNEA, in Grecian antiquity, two festivals at Naxos, in honour of two women named *Ariadne*. One of them being the daughter of king Minos, they

had, in the solemnity dedicated to her, a shew of sorrow and mourning; and, in memory of her being left by Theseus near the time of child-birth, it was usual for a young man to lie down and counterfeit all the agonies of a woman in labour. This festival is said to be first instituted by Theseus, to atone for his ingratitude to that prince.—The other Ariadne was thought to be of a gay and sprightly temper; and therefore her festival was observed with music and other expressions of mirth and joy.

ARIADNE, daughter of Minos king of Crete. Theseus being sent to destroy the Minotaur*, Ariadne was so taken with him, that, as a testimony of her love, she gave Theseus a clue of thread to guide him out of the labyrinth. Theseus, having killed the Minotaur, carried off the Athenians he had relieved, together with Ariadne; whom, however, he afterward forsook.

ARIANO, a town of Italy, in the kingdom of Naples, in the Ulterior Principality, with a bishop's see. E. Long. 15. 19. N. Lat. 41. 8.

ARIANS, in church-history, a Christian sect, followers of Arius*. Their principles, according to Spanheim, were, That Christ is only called God by way of title; that he is less than the Father, who alone is eternal, and without beginning; that he is a creature, having had a beginning of existence, and having no being before the beginning of all things: hence he was made God, and the Son of God by adoption, not by nature: that the Word was also subject to change; that the Father created all things by him as an instrument; and that he was the most excellent of all creatures: that the essence of the Father was different from the essence of the Son, neither was he co-equal, nor co-substantial, with the Father: that the Holy Ghost was not God, but the creature of the Son, inferior in dignity to the Father and Son, and co-worker in the creation.—In their doxology, the Arians ascribed *Glory to the Father, through the Son, in the Holy Ghost*.

ARIAS MONTANUS, a learned Spanish divine, employed by Philip II. of Spain to publish another edition of the Bible, after that of cardinal Ximenes; which he finished with applause, and died at Seville in 1558.

ARICA, a port-town of South America, in the province of Los Charas, in Peru. It was formerly a considerable place: but the earthquakes, which are frequent here, have almost entirely ruined it; for there are no more than 150 families, which are most of them blacks, mulattoes, and Indians. Most of the houses are made with canes or reeds, set upright, and bound together with cords or thongs; and as it never rains here, they are covered only with mats, which makes the place look at a distance like a heap of ruins.

The vale of Arica is about a league wide, and six leagues long, next the sea, and is all a barren country, except the spot where the old town stood, which is divided into little meadows of clover grass, and plots for sugar-canes, with a few olive and cotton trees intermixt. This vale grows narrower as it runs eastward; and a league up there is a village, where they begin to cultivate pimento or Jamaica pepper, which is planted throughout all the rest of the vale; and there are several farms, which produce nothing else, that bring in the

Ariadne
||
Arica.

* See the article *Africa*.

* See *Arian*.

Ariconium the value of 80,000 crowns yearly. The Spaniards of Peru are so used to this pepper, that they dress no provisions without it. W. Long. 70. 15. S. Lat. 18. 26.

ARICONIUM, a town of the Silures, (Antonie); now Hereford, (Camden). W. Long. 2. 42. Lat. 52. 6.

ARIDAS, a kind of taffety, manufactured in the East Indies from a shining thread which is got from certain herbs, whence they are styled *aridas* of herbs.

ARIDULLAM, in natural history, a kind of zarnich found in the East Indies. See **ZARNICH**.

ARIES, in zoology. See **Ovis**.

ARIES, in astronomy, a constellation of fixed stars, drawn on the globe, in the figure of a ram. It is the first of the twelve signs of the zodiac, from which a twelfth part of the ecliptic takes its denomination.

ARIMANIUS, the evil god of the ancient Persians. The Persian Magi held two principles; a good demon or god, and an evil one; the first the author of all good, and the other of all evil: the former they supposed to be represented by light, and the latter by darkness, as their truest symbols. The good principle they named *Yezad* or *Yezdan*, or *Ormuzd* or *Hormizda*, which the Greeks wrote *Oromasdes*; and the evil demon they called *Ahriman*, and the Greeks *Arimanius*. Some of the Magians held both these principles to have been from all eternity: but this sect was reputed heterodox; the original doctrine being, that the good principle only was eternal, and the other

* De Iside et Osiride, p. 369.

created.—Plutarch * gives the following account of the Magian traditions in relation to these gods and the introduction of evil into the world, viz. That Oromazes consisted of most pure light, and Arimanius of darkness; and that they were at war with each other: that Oromazes created six gods; the first, the author of benevolence; the second, of truth; the third, of justice, riches, and the pleasure which attends good actions; and that Arimanius made as many, who were the authors of the opposite evils, or vices: that then Oromazes, triplicating himself, removed as far from the sun as the sun is from the earth, and adorned the heaven with stars, appointing the dog-star for their guardian and leader: that he also created 24 other gods, and inclosed them in an egg; but Arimanius having also made an equal number, these last perforated the egg, by which means evil and good became mixed together. However, the fatal time will come, when Arimanius, the introducer of plagues and famine, must be of necessity utterly destroyed by the former, and annihilated; then the earth being made plain and even, mankind shall live in a happy state, in the same manner, in the same political society, and using one and the same language. Theopompus writes, that, according to the Magians, the said two gods, during the space of 3000 years, alternately conquer, and are conquered; that for other 3000 years, they will wage mutual war, fight, and destroy the works of each other, till at last Hades (or the evil spirit) shall perish, and men become perfectly happy, their bodies needing no food, nor casting any shadow, i. e. being perfectly transparent.

ARIMASPI, (Pliny), a people of Sarmatia Europea, to the south of the Montes Rhiphei, said by Mela to have but one eye; a fable borrowed by Aristeas Proconnesius, according to Herodotus.

ARIMINUM, a town of Umbria, or Romagna, Ariminum at the mouth of the Ariminus, on the Gulf of Venice. The seizing on it by Cæsar gave rise to the civil war. Now called *Rimini*. E. Long. 13. 30. Lat. 44. 8.

ARION, an excellent musician and poet, inventor of dithyrambics. Periander entertained him at his court, where getting an estate, and returning to Corinth, the sailors, for lucre of his money, threw him into the sea; when, according to the poets, a dolphin, charmed with his music, took him on her back and carried him safe to shore.

ARION, an admirable horse, much more famous in poetic history than Bucephalus in that of Alexander. Authors speak variously of his origin, tho' they agree in giving him a divine one. His production is most commonly ascribed to Neptune. This god, according to some, raised him out of the ground by a stroke of his trident; according to others, he begot him upon the body of the fury Erynnyes; according to others, upon that of Ceres, whom he ravished in the form of a horse, she having previously assumed the form of a mare to elude his pursuit. This horse was nursed by the Nereids; and being sometimes yoked with the sea-horses of Neptune to the chariot of this god, he drew him with incredible swiftness through the sea. He had this singularity in him, that his right feet resembled those of a man. Neptune gave him to Capreus king of Haliartus. Capreus made a present of him to Hercules; who mounted him when he took the city of Elis, gained the prize with him in the race against Cygnus the son of Mars near Træcena, and at last made a present of him to Adrastus. It is under this last master that Arion has signalized himself the most: he won the prize for racing at the Nemean games, which the princes who went to besiege Thebes instituted in the honour of Archemorus; and was the cause that Adrastus did not perish in this famous expedition, as all the other chiefs did.

ARIOSTO (Lodovico), the famous Italian poet, and author of *Orlando Furioso*, was born at the castle of Reggio in Lombardy in 1474. His father, who was major-domo to duke Hercules, lived to the extent of his fortune, so left but little at his death. Ariosto, from his childhood, shewed great marks of genius, especially in poetry; and wrote a comedy in verse on the story of Pyramus and Thisbe, which his brothers and sisters played. His father being utterly unlearned, and rather regarding profit than his son's inclination, compelled him to study the civil law, in which having plodded some years to no purpose, he quitted it for more pleasing studies; yet often lamented, as Ovid and Petrarch did before him, and our own Milton since *, that his father banished him from the muses. At the age of 24, Ariosto lost his father, and found himself perplexed with family-affairs. However, in about six years he was, for his good parts, taken into the service of Don Hippolito, cardinal of Este. At this time he had written nothing but a few sonnets; but now he resolved to make a poem, and chose Bayardo's *Orlando Innamorato* for a ground-work. However, he was prevented writing for a great many years, and was chosen as a fit person to go on an embassy to Pope Julio II. where he gave such satisfaction, that he was sent again, underwent many dangers and difficulties, and at his return was highly favoured. Then, at his leisure,

* See his Latin poem, *Ad Patrem*.

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Ariosto.

Ariosto
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Aristander.

he again applied himself to his poem : but, soon after, he incurred the cardinal's displeasure for refusing to accompany him into Hungary ; by which he was so discouraged, that he deferred writing for 14 years, even till the cardinal's death. After that, he finished by degrees, in great perfection, that which he began with great expectation. Duke Astolfo offered him great promotions if he would serve him ; but, preferring liberty to grandeur, he refused this and other great offers from princes and cardinals, particularly from Leo X. from all whom he received notwithstanding great presents. The duke of Ferrara delighted so much in his comedies, of which he wrote five, that he built a stage on purpose to have them played in his court, and enabled our poet to build himself a house in Ferrara, with a pleasant garden, where he used to compose his poems, which were highly esteemed by all the princes in Italy, who sent him many presents ; but he said, " he would not sell his liberty for the best cardinal's hat in Rome." It was but a small, though convenient house : being asked, why he had not built it in a more magnificent manner, since he had given such noble descriptions of sumptuous palaces, beautiful porticos, and pleasant fountains, in his Orlando Furioso ? He replied, that words were cheaper laid together than stones. Upon the door was the following inscription :

*Parva, sed apta mihi, sed nulli obnoxia, sed nm
Sordida, parva meo sed tamen are, domus.*

Which Mr Harrington thus translates :

This house is small, but fit for me, but hurtful unto none ;
But yet not sordid, as you see, yet paid for with mine own.

In his diet he was temperate, and so careless of dainties, that he was fit to have lived in the world when they fed upon acorns. Whether he was ever married, is uncertain. He kept company with one Alexandria, to whom, it was reported, he was married privately, and a lady Geneva, whom he slyly mentions in the 24th book of his Orlando, as poets are apt to intermix with their fictions some real amours of their own. He was urged to go ambassador to pope Clement, but would by no means accept this embassy. He translated the *Menececi* of Plautus : and all his own comedies were so esteemed, that they were frequently acted by persons of the first quality ; and when his Lena was first represented, Ferdinand of Este, afterwards Marquis of Massa, so far honoured the piece as to speak the prologue. He began one of his comedies in his father's lifetime, when the following incident shews the remarkable talent he had for poetry. His father one day rebuked him sharply, charging him with some great fault ; but all the while he returned him no answer. Soon after, his brother began on the same subject ; but he easily refuted him, and, with strong arguments, justified his own behaviour. " Why then, said his brother, did you not satisfy my father ? " " In truth, said Lodovico, I was thinking of a part in my comedy, and methought my father's speech to me was so suited to the part of an old man chiding his son, that I forgot I was concerned in it myself, and considered it only to make it my play." It is also reported of Ariosto, that, coming by a potter's shop, he heard him singing a stave out of his Orlando, with so bad a grace, that, out of all patience, he broke with his stick several of his pots. The potter, in a pitiful tone,

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asking what he meant by wronging a poor man that had never injured him. " You rascal, (he replied), I have not done thee half the wrong thou hast done me : for I have broken but two or three pots of thine, not worth so many halfpence ; whereas thou hast broken and mangled a stanza of mine worth a mark of gold."

Ariosto was tall, of a melancholy complexion, and so absorbed in study and meditation, that he often forgot himself. His picture was drawn by Titian in a masterly manner. He was honoured with the laurel by the hands of the emperor Charles V. He was naturally affable, always assuming less than was his due, yet never putting up a known injury even from his superiors. He was so fearful on the water, that, whenever he went out of a ship, he would see others go before him ; and, on land, he would alight from his horse on the least apprehension of danger. He was of an amorous disposition, and left two natural sons. He enjoyed the friendship of the most eminent men of learning of his time, most of whom he mentions with great respect in the last canto of his Orlando Furioso. His constitution was but weakly, so that he was obliged to have recourse to physicians the greatest part of his life. He bore his last sickness with great resolution and serenity ; and died at Ferrara the 8th of July, 1533, according to Sir John Harrington, being then fifty-nine years of age. He was interred in the church of the Benedictine monks, who, contrary to their custom, attended his funeral. He had a bust erected to him, and the following epitaph, written by himself, inscribed upon his tomb :

*Ludovici Ariostii humanum ossa
Sub hoc marmore, seu sub hac humo, seu
Sub quidquid voluit benignus hares,
Sive herede benignior comes, seu
Opportunius incidens vltor :
Nam scire haud potuit futura : sed nec
Tanti erat, vacuum sibi cadaver
Ut unam cuperet parare.
Vivens ista tamen sibi paravit,
Quæ scribi voluit suo sepulchro,
Olim si quod haberet id sepulchrum :
Ne cum spiritus hoc brevi peractò
Præscripto spatio missilios artus,
Quos ægre ante reliquerat, posset,
Huc et hac eliceret huc et hoc revellem
Dum noscat proprium, diu vegetur.*

ARIPO, a strong town of Asia, on the western coast of the island of Ceylon, at the mouth of the river Sarunda. It belongs to the Dutch ; and to the east of it is a bank, where they fish for pearls. E. Long. 80. 25. N. Lat. 8. 42.

ARISH, a Persian long measure, containing about 38 English inches.

ARISI, the Indian name for the plant which produces the rice. See ORYZA.

ARISTA, or Awn, among botanists, a long needle-like beard, which stands out from the hulk of a grain of corn, grass, &c.

ARISTÆUS, son of Apollo and Cyrene, whom, for the many services he had rendered to mankind by his knowledge of all profitable arts, the gods placed amongst the stars ; so that he is the Aquarius in the zodiac. The resemblance of his history to that of Moses has been curiously discussed by Huetius.

ARISTANDER, a famous soothsayer under Alexander the Great, over whom he gained a wonder-

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ful influence by the good success of his art. He had already had the same employment at the court of king Philip; and it was he who explained better than his brethren the dream that this prince had after having married Olympias.

ARISTARCHUS, a Grecian philosopher of Samos, one of the first that maintained that the earth turns upon its own centre. We are not sure of the age in which he lived; and have none of his works but a *Treatise of the greatness and distance of the Sun and Moon*, translated into Latin by Frederic Commandine, and published with Pappus's explanations in 1572.

ARISTARCHUS, a celebrated grammarian, much esteemed by Ptolemy Philometor, who committed to him the education of his son. He applied himself chiefly to criticism, and made a revival of Homer's poems, but in too magisterial a way; for such verses as he did not like he treated as spurious. He commented on other poets; Cicero and Horace made use of his name to express a very rigid critic.

ARISTIDES, surnamed the *Just*, flourished at Athens at the same time with Themistocles, who triumphed over him by his boisterous eloquence, and got him banished, 483 years before Christ*: but Aristides being recalled a short time after, would never join with the enemies of Themistocles, to get him banished; for nothing could make him deviate from the strictest rules of moderation and justice. Aristides brought the Greeks to unite against the Persians; distinguished himself at the famous battle of Marathon, and that of Salamine and Platea; and established an annual income of 460 talents for a fund to supply the expences of war. This great man died poor, though he had the management of the revenues of Greece, that the state was obliged to pay his funeral expences, to give fortunes to his daughters in marriage, and a maintenance to his son Lyfimachus.

ARISTIDES of Miletus, a famous Greek author, often cited by the ancients.

ARISTIDES, a very eloquent Athenian orator, who became a convert to the Christian religion, and about the year 124 presented to the emperor Adrian an apology for the Christians.

ARISTIDES (Ælius), a celebrated orator, born in Mysia, about 129 years before the Christian era. The best edition of his works is that of Oxford, printed in Greek and Latin, in two volumes quarto.

ARISTIDES, a painter cotemporary with Apelles, flourished at Thebes about the 122^d Olympiad. He is said to have been the first who attempted to delineate the passions of the mind in colours. His Bacchus was so excellent a piece, as to become proverbial.

ARISTIPPUS, the founder of the Cyrenaic sect of philosophy, was the son of Arcetades, and born at Cyrene in Libya. He flourished about the 96th Olympiad. The great reputation of Socrates induced him to leave his own country, and remove to Athens, that he might have the satisfaction of hearing his discourses. He was chiefly delighted with those discourses of Socrates that related the most to pleasure; which he asserted to be the ultimate end in which all happiness consists. His manner of life was agreeable to his opinion; for he indulged himself extremely in all the luxuries of dress, wine, and women. Though he had a good estate, and three country-seats, yet he was the only one of the

disciples of Socrates who took money for teaching; which being observed by the philosopher, he asked Aristippus, How he came to have so much? Who in reply asked him, How he came to have so little? Upon his leaving Socrates, he went to Ægina, as Athenæus informs us, where he lived with more freedom and luxury than before. Socrates sent frequent exhortations to him, in order to reclaim him; but all in vain: and with the same view he published that discourse which we find in Xenophon. Here Aristippus became acquainted with Lais, the famous courtesan of Corinth; for whose sake he took a voyage to that city. He continued at Ægina till the death of Socrates, as appears from Plato's *Phædo*, and the epistle which he wrote upon that occasion. He returned at last into his own country Cyrene, where he professed philosophy, and instituted a sect which, as we observed above, was called the *Cyrenaic*, from the place, and by some writers the *Hedonic* or voluptuous, from its doctrines. During the height of the grandeur of Dionysius the Sicilian tyrant, a great many philosophers resorted to him; and among the rest Aristippus, who was tempted thither by the magnificence of that court. Dionysius asking him the reason of his coming, he replied, "That it was in order to give what he had, and to receive what he had not:" or, as others represent it, "That when he wanted wisdom, he went to Socrates; but now as he wanted money, he was come to him." He very soon insinuated himself into the favour of Dionysius; for, being a man of a soft easy temper, he conformed himself exactly to every place, time, and person, and was a complete master of the most refined complaisance.

We have several remarkable passages concerning him during his residence at that court mentioned by Diogenes Laertius. Dionysius, at a feast, commanded that all should put on womens purple habits, and dance in them. But Plato refused, repeating these lines:

I cannot in this gay effeminate dress
Disgrace my manhood, or my sex betray.

But Aristippus readily submitted to the command, and made this reply immediately:

— At feasts, where mirth is free,
A sober mind can never be corrupted.

At another time, interceding with Dionysius in behalf of a friend, but not prevailing, he cast himself at his feet: being reproved by one for that excess of humility, he replied, "That it was not he who was the cause of that submission; but Dionysius, whose ears were in his feet." Dionysius shewed him three beautiful courtesans, and ordered him to take his choice. Upon which, he took them all three away with him, alleging that Paris was punished for preferring one to the other two: but when he had brought them to his door, he dismissed them, in order to shew that he could either enjoy or reject with the same indifference. Having desired money of Dionysius, the latter observed to him, that he had assured him a wife man wanted nothing. "Give me (says he) what I ask, and we will talk of that afterwards." When Dionysius had given it him, "Now (says he), you see I do not want." By this complaisance he gained so much upon Dionysius, that he had a greater regard for him than for all the rest of the philosophers, though he sometimes spoke with such freedom to that king, that he incurred his displeasure. When Dionysius asked, Why philosophers haunted the gates

of

* See Orosius.

Aristippus. of rich men, but not rich men those of philosophers? he replied, "Because the latter know what they want, and the others not." Another time, Dionysius repeating (out of Sophocles, as Plutarch affirms, who ascribes this to Zeno) these verses,

He, that with tyrants seeks for bare support,
Enslaves himself, though free he came to court;

he immediately answered,

He is no slave, if he be free to come.

Diocles, as Laertius informs us, related this in his *Lives of the Philosophers*; though others ascribe this saying to Plato. Aristippus had a contest with Antisthenes the Cynic philosopher; notwithstanding which, he was very ready to employ his interest at court for some friends of Antisthenes, to preserve them from death, as we find by a letter of his to that philosopher. Diogenes followed the example of his master Antisthenes in ridiculing Aristippus, and called him the *court-spaniel*.

We have many apophthegms of his preserved. Suidas observes, that he surpassed all the philosophers in the acuteness of his apophthegms. Being once railed at, he left the room; and the person who abused him, following him, and asking him why he went away, he answered, "Because it is in your power to rail, but it is not in my power not to hear you." A person observing, that the philosophers frequented the houses of rich men; "Why (says he), the physicians frequent the chambers of the sick, yet that is no reason why a man should rather chuse to lie sick than be cured." To one who boasted of his great readings, he said, "That as they who feed and exercise most are not always more healthy than they who only eat and exercise to satisfy nature; so neither they who read much, but they who read no more than is useful, are truly learned." Among other instructions which he gave to his daughter Arete, he advised her particularly to despise superfluity. To one who asked him what his son would be the better for being a scholar? "If for nothing else (said he), yet for this alone, that when he comes into the theatre, one stone will not sit upon another." When a certain person recommended his son to him, he demanded 500 drachmas; and upon the father's replying, that he could buy a slave for that sum, "Do so (said he), and thou'lt be master of a couple." Being reproached, because, having a suit of law depending, he fed a lawyer to plead for him, "Just so (said he), when I have a great supper to make, I always hire a cook." Being asked what was the difference between a wife man and a fool, he replied, "Send both of them together naked to those who are acquainted with neither of them, and then you'll know." Being reproved by a certain person (who, according to Mr Stanley, was Plato) for his costly and voluptuous feasts, "I warrant you (said he), that you would not have bestowed three farthings upon such a dinner;" which the other confessing, "Why, then (said he) I find myself less indulgent to my palate, than you are to your covetous humour;" or, as it is otherwise represented, "I find, that I love my belly, and you love your money." When Simus, treasurer to Dionysius, shewed him his house magnificently furnished, and paved with costly marble, (for he was a Phrygian, and consequently profuse); Aristippus spit in his face: upon which the other growing angry, "Why, truly (said he), I could not find a

fitter place." His servant carrying after him a great weight of money, and being ready to sink upon the road under his burden, he bid him throw away all what was too much for him to carry. Horace mentions this fact in his third satire of the second book:

Quid simile isti

Grævus Aristippus? qui servos projicere aurum
In media jussit Libya, quia tardius irent
Propter onus segnes.

Being asked, what things were most proper for children to be instructed in? he answered, "Those which might prove of the greatest advantage to them when they came to be men." Being reproached for going from Socrates to Dionysius, he replied, "That he went to Socrates when he wanted serious instruction, and to Dionysius for diversion." Having received money of Dionysius at the same time that Plato accepted a book only, and being reproached for it, "The reason is plain (says he), I want money, and Plato wants books." Having lost a considerable farm, he said to one who seemed excessively to compassionate his loss, "You have but one field; I have three left: why should not I rather grieve for you?" Plutarch, who relates this in his book *De Tranquillitate Animi*, observes upon it, that it is very absurd to lament for what is lost, and not to rejoice for what is left. When a person told him, "That the land for his sake was lost," he replied, "That it was better so, than that he should be lost for the land." Being cast by shipwreck ashore on the island of Rhodes, and perceiving mathematical schemes and diagrams drawn upon the ground, he said, "Courage, friends; for I see the footsteps of men."

After he had lived a long time with Dionysius, his daughter Arete sent to him, to desire his presence at Cyrene, in order to take care of her affairs, since she was in danger of being oppressed by the magistrates. But he fell sick in his return home, and died at Lipara, an Æolian island. With regard to his principal opinions; like Socrates, he rejected the sciences as they were then taught, and pretended that logic alone was sufficient to teach truth and fix its bounds. He asserted, that pleasure and pain were the criterions by which we were to be determined; that these alone made up all our passions; that the first produced all the soft emotions, and the latter all the violent ones. The assemblage of all pleasure, he asserted, made true happiness, and that the best way to attain this was to enjoy the present moments. He wrote a great many books: particularly the History of Libya, dedicated to Dionysius; several Dialogues; and four books of the Luxury of the Ancients. There are four epistles of his extant in the Socratic Collection published by Leo Alatius.

Besides Arete his daughter, whom he educated in philosophy, Aristippus had also a son, whom he disinherited for his stupidity. Arete had a son, who was named *Aristippus* from his grandfather, and had the surname of *Μεγίστανος* from his mother's instructing him in philosophy. Among his auditors, besides his daughter Arete, we have an account of Æthiops of Ptolemais, and Antipater of Cyrene. Arete communicated the philosophy, which she received from her father, to her son Aristippus, who transmitted it to Theodorus the Atheist, who instituted the sect called *Theodorean*. Antipater communicated the

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philosophy of Aristippus to Epitimetes his disciple; Epitimetes to Paræbates; Paræbates to Hegesias and Anniceris; and these two last, improving it by some additions of their own, obtained the honour each of them of giving a name to the *Hegesiac* and *Annicerian* sect.

Laertius mentions two other persons of the name of Aristippus; one, who wrote the History of Arcadia; the other, a philosopher of the New Academy.

ARISTO, a Stoic philosopher, the disciple of Zeno the chief of the Stoics, flourished about 290 years before the Christian æra. He differed but little from his master Zeno. He rejected logic as of no use, and natural philosophy as being above the reach of the human understanding. It is said, that being bald, the sun burnt his head; and that this caused his death.—There is a saying of his recorded, which might render the doctrine of Aristippus less odious than it ordinarily is; (see ARISTIPPUS). He used to say, "That a philosopher might do those of his hearers a prejudice who put a wrong interpretation upon good meanings; as for example, that the school of Aristippus might send out debauchees, and that of Zeno Cynics;" which seems to imply, that the doctrine of this philosopher never produced this effect but when it was misunderstood. He should also have added, that every teacher is therefore obliged to forbear laying down ambiguous maxims, or to prevent false glosses being put upon them.

ARISTO (Titus), a Roman lawyer, perfect master of the public and civil law, of history and antiquity. The Pandects mention some books of his, as does Aulus Gellius.—He was cotemporary with Pliny the younger, who gives him a noble character, and had a most tender friendship for him. See *Pliny Epist.* lib. i. ep. 22.

ARISTOCRACY, a form of government where the supreme power is vested in the principal persons of the state. See GOVERNMENT.

ARISTOGITON, a famous Athenian, who, with Armodius, killed Hipparchus, tyrant of Athens, about 513 years before the Christian æra. The Athenians erected a statue to him.

ARISTOLOCHIA, BIRTHWORT, a genus of the hexandria order, belonging to the gynandria class of plants.

Species. Of this genus there are 21 different species; but only the four following merit description. 1. The rotunda, is a native of the south of France, of Spain, and Italy, from whence the roots are brought for medicinal use. The roots are roundish, grow to the size of small turnips, being in shape and colour like the roots of cyclameus, which are frequently fold instead of them. This sort hath three or four weak trailing branches, which lie on the ground when they are not supported, and extend two feet in length; the leaves are heart-shaped and rounded at their extremity; the flowers come out singly at every leaf, toward the upper part of the stalk. They are of a purplish black colour; and are frequently succeeded by oval seed-vessels, having six cells, full of flat seeds. 2. The longa, is a native of the same countries. This species hath long tap-roots like carrots; the branches are weak and trailing, extending little more than a foot; the flowers come out from the wings of the leaves like the other, are of a pale purple colour, and are frequently succeeded by seed-vessels like the other. 3. The serpentaria, is a na-

tive of Virginia and Carolina, from whence the *radix serpentariae*, so much used in medicine, is brought over. The plant rises out of the ground in one, two, and sometimes three plant stalks, which at every little distance are crooked or undulated. The leaves stand alternately, and are about three inches long, in form somewhat like the *smilax aspera*. The leaves grow close to the ground on footstalks an inch long, of a singular shape, and of a dark purple colour. A round annulated capsule succeeds the flower. It is filled with seeds, which are ripe in May. The usual price of the root when dried is 6 d. per pound, both in Virginia and Carolina, which is money hardly earned; yet the negro slaves employ great part of the time allowed them by their masters in search of it, which is the reason that there are seldom found any but very small plants of this species. When they are planted in gardens in those countries where they are natives, the plants increase so much in two years time, that the hand can scarce grasp the stalks of a single one. This species delights in woods, and is usually found near the roots of great trees. 4. The indica, or contrayerva of Jamaica, is a native of that island, where its roots are used instead of the true contrayerva. It hath long trailing branches, which climb upon the neighbouring plants, and sometimes rise to a considerable height. The flowers are produced in small clusters towards the upper part of the stalks, which are of a dark purple colour.

Culture. The first, second, and third sorts are propagated from seeds, which should be sown in the autumn, in pots filled with light fresh earth, and placed under a frame to preserve them from the frost. If they are plunged into a gentle hot-bed in the month of March, the plants will come up the sooner. In summer, and in autumn when the stalks begin to decay, they must be watered. In winter they must be again sheltered; and in March, before the roots begin to shoot, they must be transplanted into small separate pots filled with light earth, when they may be removed into the open air, and treated as before. The next spring, they may be planted in the open air in a warm border; where, in the autumn, when their stalks decay, if the border is covered with old tanners bark to keep out the frost, the roots will be secured; but where this care is not taken, they will frequently be killed by the frost. The fourth is tender; and therefore must be kept in a stove during the winter, or it will not live in England.

Medicinal Uses. The roots of the long and round sorts, on being first chewed, scarce discover any taste, but in a little time prove nauseously bitterish; the long somewhat the least so. The other sort instantly fills the mouth with an aromatic bitterness, which is not ungrateful. Their medical virtues are, to heat, stimulate, attenuate viscid phlegm, and promote the fluid secretions in general; they are principally celebrated in suppressions of female evacuations. The dose in substance is from a scruple to two drams. The long sort is recommended externally for cleansing and drying wounds and ulcers, and in cutaneous diseases.

The root of the serpentaria is small, light, bushy, and consists of a number of strings or fibres, matted together, issuing from one common head; of a brownish colour on the outside, and paler or yellowish within. It has an aromatic smell, like that of valerian, but

more.

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more agreeable; and a warm, bitterish, pungent taste. This root is a warm diaphoretic and diuretic; it has been greatly celebrated as an alexipharmac, and esteemed one of the principal remedies in malignant fevers and epidemic diseases. In these intentions, it is given in substance from 10 to 30 grains; and in infusion, to a dram or two. Both watery and spirituous menstrua extract its virtue by infusion, and elevate some share of its flavour in distillation; along with the water a small portion of essential oil arises.

ARISTOMENES, a general of the Messenians, renowned for his valour and virtue *.

ARISTOPHANES, a celebrated comic poet of Athens. He was cotemporary with Plato, Socrates, and Euripides; and most of his plays were written during the Peloponnesian war. His imagination was warm and lively, and his genius particularly turned to raillery: he had also great spirit and resolution; and was a declared enemy to slavery, and to all those who wanted to oppress their country. The Athenians suffered themselves in his time to be governed by men who had no other views than to make themselves masters of the commonwealth. Aristophanes exposed the designs of these men, with great wit and severity, upon the stage. Cleo was the first whom he attacked, in his comedy of the *Equiter*; and as there was not one of the comedians who would venture to personate a man of his great authority, Aristophanes played the character himself, and with so much success, that the Athenians obliged Cleo to pay a fine of five talents, which were given to the poet. He described the affairs of the Athenians in so exact a manner, that his comedies are a faithful history of that people. For this reason, when Dionysius king of Syracuse desired to learn the state and language of Athens, Plato sent him the comedies of Aristophanes, telling him, these were the best representation thereof. He wrote above 50 comedies; but there are only 11 extant which are perfect: these are, *Plutus*, the *Clouds*, the *Frogs*, *Equites*, the *Acharnenses*, the *Wasps*, *Peace*, the *Birds*, the *Ecclesiastus* or *Female Orators*, the *Thesmophizusæ* or *Priestesses of Ceres*, and *Lyssistrata*. The

Clouds, which he wrote in ridicule of Socrates *, is the most celebrated of all his comedies: Madam Dacier tells us, she was so much charmed with this performance, that after she had translated it, and read it over 200 times, it did not become the least tedious to her, which she could not say of any other piece; and that the pleasure which she received from it was so exquisite, that she forgot all the contempt and indignation which Aristophanes deserved for employing his wit to ruin a man, who was wisdom itself, and the greatest ornament of the city of Athens. Aristophanes, having conceived some aversion to the poet Euripides, satirizes him in several of his plays, particularly in his *Frogs* and his *Thesmophizusæ*. He wrote his *Peace* in the 10th year of the Peloponnesian war, when a treaty for 50 years was concluded between the Athenians and the Lacedæmonians, though it continued but seven years. The *Acharnenses* was written after the death of Pericles, and the loss of the battle in Sicily, in order to dissuade the people from intruding the safety of the commonwealth to such imprudent generals as Lamachus. Soon after, he represented his *Aves*, or *Birds*; by which he admonished the Athenians to fortify Decelæa, which

he calls by a fictitious name *Nephelococcygia*. The *Vespæ*, or *Wasps*, was written after another loss in Sicily, which the Athenians suffered from the misconduct of Chares. He wrote the *Lyssistrata* when all Greece was involved in a war; in which comedy the women are introduced debating upon the affairs of the commonwealth, when they come to a resolution, not to go to bed with their husbands till a peace should be concluded. His *Plutus*, and other comedies of that kind, were written after the magistrates had given orders that no person should be exposed by name upon the stage. He invented a peculiar kind of verse, which was called by his name, and is mentioned by Cicero in his *Brutus*; and Suidas says, that he also was the inventor of the tetrameter and octameter verse.

Aristophanes was greatly admired among the ancients, especially for the true Attic elegance of his style. The time of his death is unknown; but it is certain he was living after the expulsion of the tyrants by Thrasybulus, whom he mentions in his *Plutus* and other comedies. There have been several editions and translations of this poet. Nicodemus Frisching, a German, famous for his classical knowledge, in the 16th century, translated *Plutus*, the *Clouds*, the *Frogs*, the *Equites*, and the *Acharnenses*, into Latin verse. Quintus Septimus Florens rendered into Latin verse the *Wasps*, the *Peace*, and *Lyssistrata*; but his translation is full of obsolete words and phrases. Madam Dacier published at Paris, in 1692, a French version of *Plutus*, and the *Clouds*, with critical notes, and an examination of them according to the rules of the theatre. Mr Lewis Theobald likewise translated these two comedies into English, and published them with remarks. The most noble edition of this author is that published by Ludolphus Kuster, at Amsterdam, in folio, in 1710, and dedicated to Charles Montague earl of Halifax.

ARISTOTLE, the chief of the Peripatetic philosophers, born at Stagyræ, a small city in Macedonia, in the 99th Olympiad, about 384 years before the birth of Christ. He was the son of Nicomachus, physician to Amyntas the grandfather of Alexander the Great. He lost his parents in his infancy; and Proxenes, a friend of his father's, who had the care of his education, taking but little notice of him, he quitted his studies, and gave himself up to the follies of youth. After he had spent most of his patrimony, he entered into the army; but not succeeding in this profession, he went to Delphos to consult the oracle what course of life he should follow; when he was advised to go to Athens, and study philosophy. He accordingly went thither about 18 years of age, and studied under Plato till he was 37. By this time he had spent his whole fortune; and we are told that he got his living by selling powders, and some receipts in pharmacy. He followed his studies with most extraordinary diligence, so that he soon surpassed all in Plato's school. He eat little, and slept less; and, that he might not over-sleep himself, Diogenes Laertius tells us, that he lay always with one hand out of the bed, having a ball of brass in it, which, by its falling into a basin of the same metal, awaked him. We are told, that Aristotle had several conferences with a learned Jew at Athens, and that by this means he instructed himself in the sciences and religion of the Egyptians, and thereby saved

Aristo-
phanes,
Aristotle.

* See the ar-
ticle *Mes-
sina*.

* See the ar-
ticle
Socrates.

Aristotle.

himself the trouble of travelling into Egypt. When he had studied about 15 years under Plato, he began to form different tenets from those of his master, who became highly piqued at his behaviour. Upon the death of Plato, he quitted Athens; and retired to Atarnya, a little city of Mysia, where his old friend Hermias reigned. Here he married Pythias, the sister of this prince, whom he is said to have loved so passionately, that he offered sacrifice to her. Some time after, Hermias having been taken prisoner by Meranon the king of Persia's general, Aristotle went to Mitylene the capital of Lesbos, where he remained till Philip king of Macedon, having heard of his great reputation, sent for him to be tutor to his son Alexander, then about 14 years of age: Aristotle accepted the offer; and in eight years taught him rhetoric, natural philosophy, ethics, politics, and a certain sort of philosophy, according to Plutarch, which he taught nobody else. Philip erected statues in honour of Aristotle; and for his fake rebuilt Stagyræ, which had been almost ruined by the wars.

Aristotle having lost the favour of Alexander by adhering to Calisthenes his kinsman, who was accused of a conspiracy against Alexander's life, he removed to Athens, where he set up his new school. The magistrates received him very kindly; and gave him the Lyceum, so famous afterwards for the concourse of his disciples: here he taught, according to the custom long established, a public and a secret doctrine; and as he gave his lectures walking along among his auditors, his sect assumed the name of *Peripatetic*. Here also it was, according to some authors, that he composed his principal works. Plutarch, however, tells us, that he had already wrote his books of physics, morals, metaphysics, and rhetoric. The same author says, that Aristotle being piqued at Alexander, because of the presents he had sent to Xenocrates, was moved with so much resentment, that he entered into Antipator's conspiracy against this prince. The advocates for Aristotle, however, maintain this charge to have been without foundation; that at least it made no impression on Alexander, since about the same time he ordered him to apply himself to the study of animals; and sent him, in order to defray his expences, eight hundred talents, which amounts to four hundred and eighty thousand crowns, besides a great number of sifers and huntmen to bring him all sorts of animals.—When Aristotle was accused of impiety by one Eurymedon, a priest of Ceres, he wrote a large apology for himself, addressed to the magistrates: but knowing the Athenians to be extremely jealous in regard to their religion, and remembering the fate of Socrates, he was so much alarmed, that he retired to Chalcis, a city of Eubœa, where he ended his days. Some say he poisoned himself, to avoid falling into the hands of his enemies; others affirm, that he threw himself into the Euripus, because he could not comprehend the reason of its ebbing and flowing; and there are some who tell us he died of a colic, in the 63^d year of his age, being the third of the 114th Olympiad, two years after Alexander. The Stagyræites carried away his body, and erected altars to his memory.

Besides his treatises on philosophy, he wrote also on poetry, rhetoric, law, &c. to the number of 400 treatises, according to Diogenes Laertius; or more, ac-

cording to Francis Patricius of Venice. An account of such as are extant, and of those said to be lost, may be seen in Fabricius's *Bibliotheca Græca*. He left his writings with Theophrastus, his beloved disciple and successor in the Lyceum; and forbade that they should ever be published. Theophrastus, at his death, trusted them to Neluus, his good friend and disciple; whose heirs buried them in the ground at Scepsis, a town of Troas, to secure them from the king of Pergamus, who made great search every where for books to adorn his library. Here they lay concealed 160 years, until, being almost spoiled, they were sold to one Apellicon, a rich citizen of Athens. Sylla found them at this man's house, and ordered them to be carried to Rome. They were some time after purchased by Tyrannion a grammarian: and Andronicus of Rhodes having bought them of his heirs, was in a manner the first restorer of the works of this great philosopher; for he not only repaired what had been decayed by time and ill-keeping, but also put them in a better order, and got them copied. There were many who followed the doctrine of Aristotle in the reigns of the twelve Cæsars, and their numbers increased much under Adrian and Antoninus: Alexander Aphrodisinus was the first professor of the Peripatetic philosophy at Rome, being appointed by the emperors Marcus Aurelius and Lucius Verus; and in succeeding ages the doctrine of Aristotle prevailed among almost all men of letters, and many commentaries were written upon his works.

The first doctors of the church disapproved of the doctrine of Aristotle, as allowing too much to reason and sense; but Anatolius bishop of Loadicea, Didymus of Alexandria, St Jerome, St Augustin, and several others, at length wrote and spoke in favour of it. In the sixth age, Boethius made him known in the west, and translated some of his pieces into Latin. But from the time of Boethius to the eighth age, Joannes Damascenus was the only man who made an abridgement of his philosophy, or wrote any thing concerning him. The Grecians, who took great pains to restore learning in the 11th and following ages, applied much to the works of this philosopher, and many learned men wrote commentaries on his writings: amongst these were Alfarabius, Algazel, Avicenna, and Averroes. They taught his doctrine in Africa, and afterwards at Cordova in Spain. The Spaniards introduced his doctrine into France, with the commentaries of Averroes and Avicenna; and it was taught in the university of Paris, until Amauri, having supported some particular tenets on the principles of this philosopher, was condemned of heresy, in a council held there in 1210, when all the works of Aristotle that could be found were burnt, and the reading of them forbidden under pain of excommunication. This prohibition was confirmed, as to the physics and metaphysics, in 1215, by the Pope's legate; though at the same time he gave leave for his logic to be read, instead of St Augustin's used at that time in the university. In the year 1265, Simon, cardinal of St Cecil, and legate from the holy see, prohibited the reading of the physics and metaphysics of Aristotle. All these prohibitions, however, were taken off in 1366; for the cardinals of St Mark and St Martin, who were deputed by Pope Urban V. to reform the university of Paris, permitted the reading of those books, which had been prohibited: and in the

year

Aristotle,
Aristoxenus.

year 1448, Pope Stephen approved of all his works, and took care to have a new translation of them into Latin.

Passing from hand to hand, in the manner above-mentioned, the works of Aristotle have greatly suffered from the ignorance or the inaccuracy of transcribers. This has given birth to much obscurity, and to omisions that are now irreparable: it is this which has rendered the sense of Aristotle so doubtful, and opened such a wide field for the combats of scholastic philosophy. Besides, our philosopher was not himself very much inclined to be perfectly plain and familiar. His style was difficult and concise. He has employed a mathematical manner of communication; often uses terms which have no determinate meaning; and, with many of his doctrines, he mixes ancient opinions as taken for granted, which are altogether false or uncertain. In a word, the Peripatetic philosophy is very obscure in itself, and commentators have rather contributed to increase the obscurity.

ARISTOXENUS, the most ancient musical writer, of whose works any tracts are come down to us. He was born at Tarentum, a city in that part of Italy called *Magna Græcia*, now Calabria. He was the son of a musician, whom some call *Mnesiar*, others *Spintharus*. He had his first education at Mantineæ, a city of Arcadia, under his father, and Lamprus of Erythræ; he next studied under Xenophilus, the Pythagorean; and lastly under Aristotle, in company with Theophrastus. Suidas, from whom these particulars are transcribed, adds, that Aristoxenus, enraged at Aristotle having bequeathed his school to Theophrastus,

traded him ever after. But Aristoteles the Peripatetic, in Eusebius, exculpates Aristoxenus in this particular, and assures us that he always spoke with great respect of his master Aristotle. From the preceding account it appears that Aristoxenus lived under Alexander the Great and his first successors. His *Harmonics* in three books, all that are come down to us, together with Ptolemy's *Harmonics*, were first published by Gogavinus, but not very correctly, at Venice, 1562, in 4to, with a Latin version. John Meursius next translated the three books of Aristoxenus into Latin, from the MS. of Jos. Scaliger; but, according to Meibomius, very negligently. With these he printed at Leyden, 1616, 4to, Nicomachus and Alypius, two other Greek writers on music. After this, Meibomius collected these musical writers together; to which he added Euclid, Bacchius senior, Aristides Quintilianus; and published the whole, with a Latin version and notes, from the elegant press of Elzevir, Amst. 1652. The learned editor dedicates these ancient musical treatises to Christina queen of Sweden. Aristoxenus is said by Suidas to have written 452 different works, among which those on music were the most esteemed; yet his writings on other subjects are very frequently quoted by ancient authors, notwithstanding Cicero and some others say that he was a bad philosopher, and had nothing in his head but music. The titles of several of the lost works of Aristoxenus, quoted by Athenæus and others, have been collected by Meursius in his notes upon this author, by Tonsius and Menage, all which Fabricius has digested into alphabetical order.

Aristoxenus.

A R I T H M E T I C

IS a science which explains the properties of numbers, and shews the method or art of computing by them.

History of Arithmetic.

At what time this science was first introduced into the world, we can by no means determine. That some part of it, however, was coeval with the human race is absolutely certain. We cannot conceive how any man endowed with reason can be without some knowledge of numbers. We are indeed told of nations in America who have no word in their language to express a greater number than three; and this they call *poetararorincouroac*: but that such nations should have no idea of a greater number than this, is absolutely incredible. Perhaps they may compute by threes, as we compute by tens; and this may have occasioned the notion that they have no greater number than three.

But though we cannot suppose any nation, or indeed any single person, ever to have been without some knowledge of the difference between greater and smaller numbers, it is possible that mankind may have subsisted for a considerable time without bringing this science to any perfection, or computing by any regular scale, as 10, 60, &c. That this, however, was very early introduced into the world, even before the flood, we may gather from the following expression in Enoch's prophecy, as mentioned by the Apostle Jude: "Behold, the Lord cometh with *ten thousands* of his saints." This shews, that even at that time men had ideas of

numbers as high as we have at this day, and computed them also in the same manner, namely by tens. The directions also given to Noah concerning the dimensions of the ark, leave us no room to doubt that he had a knowledge of numbers, and of measures likewise. When Rebekah was sent away to Isaac, Abraham's son, her relations wished she might be the mother of *thousands of millions*; and if they were totally unacquainted with the rule of multiplication, it is difficult to see how such a wish could have been formed.

It is probable, therefore, that the four fundamental rules of Arithmetic have always been known to some nation or other. No doubt, as some nations, like the Europeans formerly, and the Africans and Americans now, have been immersed in the most abject and deplorable state of ignorance, they might remain for some time unacquainted with numbers, except such as they had immediate occasion for; and, when they came afterwards to improve, either from their own industry, or hints given by others, might fancy that they themselves, or those from whom they got the hint, had invented what was known long before. The Greeks were the first European nation among whom arithmetic arrived at any degree of perfection. M. Gouget is of opinion, that they first used pebbles in their calculations: a proof of which, he imagines, is, that the word *calculi*, which comes from *calculus*, a little stone or flint, among other things, signifies to calculate. The same, he thinks, is probable of the Romans; and derives the word *calculation*

Knowledge
of numbers
coeval with
the human
race.

calculation from the use of little stones (*calculi*) in their first arithmetical operations.

2
Grecian method of computation.

If this method, however, was at all made use of, it must have been but for a short time, since we find the Greeks very early made use of the letters of the alphabet to represent their numbers. The 24 letters of their alphabet, taken according to their order, at first denoted the numbers 1, 2, 3, 4, 5, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 100, 200, 300, 400, 500, 600, 700, and 800; to which they added the three, following ϵ , δ , γ , to represent 6, 90, and 900. The difficulty of performing arithmetical operations by such marks as these may easily be imagined, and is very conspicuous from Archimedes's treatise concerning the dimensions of a circle.

3
Roman Notation.

The Romans followed a like method; and besides characters for each rank of classes, they introduced others for five, fifty, and five hundred. Their method is still used for distinguishing the chapters of books, and some other purposes. Their numeral letters and values are the following.

I V X L C D M

One, five, ten, fifty, one hundred, five hundred, one thousand.

Any number, however great, may be represented by repeating and combining these according to the following rules.

1st. When the same letter is repeated twice, or oftener, its value is represented as often. Thus II signifies two; XXX thirty, CC two hundred.

2^d. When a numeral letter of lesser value is placed after one of greater, their values are added: thus XI signifies eleven, LXV sixty-five, MDCXXVIII one thousand six hundred and twenty-eight.

3^d. When a numeral letter of lesser value is placed before one of greater, the value of the lesser is taken from that of the greater: thus IV signifies four, XL forty, XC ninety, CD four hundred.

Sometimes IJ is used instead of D for 500, and the value is increased ten times by annexing J to the right hand.

Thus IJ signifies 500. Also CIJ is used for 1000

IJ	5000	CCIJ	for 10000
IJJ	50000	CCCIJJ	for 100000

Sometimes thousands are represented by drawing a line over the top of the numeral, V being used for five thousand, L for fifty thousand, CC two hundred thousand.

4
Sexagesimal Arithmetic.

About the year of Christ 200, a new kind of arithmetic, called *sexagesimal*, was invented, as is supposed, by Claudius Ptolemæus. The design of it was to remedy the difficulties of the common method, especially with regard to fractions. In this kind of arithmetic, every unit was supposed to be divided into 60 parts, and each of these into 60 others, and so on: hence any number of such parts were called *sexagesimal fractions*; and to make the computation in whole numbers more easy, he made the progression in these also *sexagesimal*. Thus from one to 59 were marked in the common way: then 60 was called a *sexagesima prima*, or first *sexagesimal* integer, and had one single dash over it; 60 was expressed thus I'; and so on to 59 times 60, or 3540, which was thus expressed LIX. He now proceeded to 60 times 60, which he called a *sexagesima secunda*, and was thus expressed I''. In like manner, twice 60 times 60, or 7200, was expressed by II'; and

so on till he came to 60 times 3600, which was a third *sexagesimal*, and expressed thus I'''. If any number less than 60 was joined with these *sexagesimals*, it was added in its proper characters without any dash: thus I XV represented 60 and 15, or 75; IV XXV is four times 60 and 25, or 265; X II XV, is 10 times 3600, twice 60 and 15, or 36,135, &c. *Sexagesimal* fractions were marked by putting the dash at the foot, or on the left hand of the letter: thus I, or I, denoted $\frac{1}{60}$; I, or I, $\frac{1}{3600}$ &c.

The most perfect method of notation, which we now use, came into Europe from the Arabians, by the way of Spain. The Arabs, however, do not pretend to be the inventors of them, but acknowledge that they received them from the Indians. Some there are indeed, who contend that neither the Arabs nor the Indians were the inventors, but that they were found out by the Greeks. But this is by no means probable; as Maximus Planudes, who lived towards the close of the 13th century, is the first Greek who makes use of them; and he is plainly not the inventor; for Dr Wallis mentions an inscription on a chimney in the parsonage-house of Helendon in Northamptonshire, where the date is expressed by M^o133, instead of 1133. Mr Luffkin furnishes a still earlier instance of their use, in the window of a house, part of which is a Roman wall, near the market-place in Colchester; where between two carved lions stands an colutcheon with the figures 1090. Dr Wallis is of opinion that these characters must have been used in England at least as long ago as the year 1050, if not in ordinary affairs, at least in mathematical ones, and in astronomical tables. How these characters came to be originally invented by the Indians we are entirely ignorant.

The introduction of the Arabian characters in notation did not immediately put an end to the *sexagesimal* arithmetic. As this had been used in all the astronomical tables, it was for their sakes retained for a considerable time. The *sexagesimal* integers went first out, but the fractions continued till the invention of decimals.

The oldest treatises extant upon the theory of arithmetic are the seventh, eighth, and ninth books of Euclid's elements, where he treats of proportion and of prime and composite numbers; both of which have received improvements since his time, especially the former. The next of whom we know any thing is Nicomachus the Pythagorean, who wrote a treatise of the theory of arithmetic, consisting chiefly of the distinctions and divisions of numbers into classes, as plain, solid, triangular, quadrangular, and the rest of the figurate numbers as they are called, numbers odd and even, &c. with some of the more general properties of the several kinds. This author is, by some, said to have lived before the time of Euclid; by others, not long after. His arithmetic was published at Paris in 1538. The next remarkable writer on this subject is Boethius, who lived at Rome in the time of Theodoric the Goth. He is supposed to have copied most of his work from Nicomachus.

From this time no remarkable writer on arithmetic appeared till about the year 1200, when Jordanus of Namur wrote a treatise on this subject, which was published and demonstrated by Joannes Faber Stapulensis in the 15th century, soon after the invention of printing.

5
Indian Characters when brought into use.

6
Treatises on Arithmetic.

Notation
and
Numeration

ing. The same author also wrote upon the new art of computation by the Arabic figures, and called this book *Algorithmus Demonstratus*. Dr Wallis says this manuscript is in the Savilian library at Oxford, but it hath never yet been printed. As learning advanced in Europe, so did the knowledge of numbers; and the writers on arithmetic soon became innumerable. About the year 1464, Regiomontanus, in his triangular tables, divided the Radius into 10,000 parts instead of 60,000; and thus tacitly expelled the sexagesimal arithmetic. Part of it, however, still remains in the division of time, as of an hour into 60 minutes, a minute into 60 seconds, &c. Ramus in his arithmetic, written about the year 1550, and published by Lazarus Schonerus in 1586, uses decimal periods in carrying on the square and cube roots to fractions. The same had been done before by our countrymen Buckley and Record; but the first who published an express treatise on decimals was Simon Stevinus, about the year 1582. As to the circulating decimals, Dr Wallis is the first who took much notice of them. He is also the author of the *arithmetic of infinites*, which has been very usefully applied to geometry. The greatest improvement, however, which the art of computation ever received, is the invention of logarithms. The honour of this invention is unquestionably due to Lord Napier baron of Merchiston in Scotland, about the end of the 16th or beginning of the 17th century. By these means arithmetic has advanced to a degree of perfection which the ancients could never have imagined possible, much less hoped to attain; and we believe it may now be reckoned one of those few sciences which have arrived at their utmost height, and which is in its nature capable of little further improvement.

any distinct notion of seventeen. Experience removes this difficulty in some degree; as we become accustomed to handle larger collections, we apprehend clearly the number of a dozen or a score; but, perhaps could hardly advance to an hundred without the aid of classical arrangement, which is the art of forming so many units into a class, and so many of these classes into one of a higher kind, and thus advancing through as many ranks of classes as occasion requires. If a boy arrange an hundred stones in one row, he would be tired before he could reckon them; but if he place them in ten rows of ten stones each, he will reckon an hundred with ease; and if he collect ten such parcels, he will reckon a thousand. In this case, ten is the lowest class, an hundred is a class of the second rank, and a thousand is a class of the third rank.

There does not seem to be any number naturally adapted for constituting a class of the lowest, or any higher rank, to the exclusion of others. However, as ten has been universally used for this purpose by the Hebrews, Greeks, Romans, and Arabians, and by all nations who have cultivated this science, it is probably the most convenient for general use. Other scales, however, may be assumed, perhaps on some occasions, with superior advantage; and the principles of arithmetic will appear in their full extent, if the student can adapt them to any scale whatever: thus, if eight were the scale, 6 times 3 would be two classes and two units, and the number 18 would then be represented by 22. If 12 were the scale, 5 times 9 would be three classes and nine units, and 45 would be represented by 39, &c.

It is proper, whatever number of units constitutes a class of the lower rank, that the same number of each class should make one of the next higher. This is observed in our arithmetic, ten being the universal scale: but is not regarded in the various kinds of monies, weights, and the like, which do not advance by any universal measure; and much of the difficulty in the practice of arithmetic arises from that irregularity.

As higher numbers are somewhat difficult to apprehend, we naturally fall on contrivances to fix them in our minds, and render them familiar: but notwithstanding all the expedients we can fall upon, our ideas of high numbers are still imperfect, and generally far short of the reality; and though we can perform any computation with exactness, the answer we obtain is often incompletely apprehended.

It may not be amiss to illustrate, by a few examples, the extent of numbers which are frequently named without being attended to. If a person employed in telling money reckon an hundred pieces in a minute, and continue at work ten hours each day, he will take seventeen days to reckon a million; a thousand men would take 45 years to reckon a billion. If we suppose the whole earth to be as well peopled as Britain, and to have been so from the creation, and that the whole race of mankind had constantly spent their time in telling from a heap consisting of a quadrillion of pieces, they would hardly have yet reckoned the thousandth part of that quantity.

All numbers are represented by the ten following characters.

1	2	3	4	5	6	7	8	9	0
One,	two,	three,	four,	five,	six,	seven,	eight,	nine,	cypher.
The nine first are called <i>significant figures</i> , or <i>digits</i> ;									
4 N and									

Notation
and
Numeration

CHAP. I. NOTATION AND NUMERATION.

THE first elements of arithmetic are acquired during our infancy. The idea of one, though the simplest of any, and suggested by every single object, is perhaps rather of the negative kind, and consists partly in the exclusion of plurality, and is not attended to till that of number be acquired. Two is formed by placing one object near another; three, four, and every higher number, by adding one continually to the former collection. As we thus advance from lower numbers to higher, we soon perceive that there is no limit to this increasing operation; and that, whatever number of objects be collected together, more may be added, at least, in imagination; so that we can never reach the highest possible number, nor approach near it. As we are led to understand and add numbers by collecting objects, so we learn to diminish them by removing the objects collected; and, if we remove them one by one, the number decreases through all the steps by which it advanced, till only one remain, or none at all. When a child gathers as many stones together as suits his fancy, and then throws them away, he acquires the first elements of the two capital operations in arithmetic. The idea of numbers, which is first acquired by the observation of sensible objects, is afterwards extended to measures of space and time, affections of the mind, and other immaterial qualities.

Small numbers are most easily apprehended: a child soon knows what two and what three is; but has not

and sometimes represent units, sometimes tens, hundreds, or higher classes. When placed singly, they denote the simple numbers subjoined to the characters. When several are placed together, the first or right-hand figure only is to be taken for its simple value: the second signifies for many tens, the third for many hundreds, and the others for many higher classes, according to the order they stand in. And as it may sometimes be required to express a number consisting of tens, hundreds, or higher classes, without any units or classes of a lower rank annexed; and as this can only be done by figures standing in the second, third, or higher place, while there are none to fill up the lower ones; therefore an additional character or cypher (0) is necessary, which has no signification when placed by itself, but serves to supply the vacant places, and bring the figures to their proper station.

The following table shews the names and divisions of the classes.

8	4	3	7	9	8	2	5	6	4	7	3	8	9	7	2	6	4	5
TRILLIONS	Hundred thousand of billions			Ten thousand billions			Ten billions			Hundred thousand of millions			Ten thousand millions			Ten millions		
	Hundred thousand of billions			Ten thousand billions			Ten billions			Hundred thousand of millions			Ten thousand millions			Ten millions		
	Hundred thousand of billions			Ten thousand billions			Ten billions			Hundred thousand of millions			Ten thousand millions			Ten millions		
	Hundred thousand of billions			Ten thousand billions			Ten billions			Hundred thousand of millions			Ten thousand millions			Ten millions		
BILLIONS	Hundred thousand of millions			Ten thousand millions			Hundred millions			Ten millions			Hundred thousands			Ten thousands		
	Hundred thousand of millions			Ten thousand millions			Hundred millions			Ten millions			Hundred thousands			Ten thousands		
	Hundred thousand of millions			Ten thousand millions			Hundred millions			Ten millions			Hundred thousands			Ten thousands		
	Hundred thousand of millions			Ten thousand millions			Hundred millions			Ten millions			Hundred thousands			Ten thousands		
MILLIONS	Hundred thousands			Ten thousands			Hundreds			Tens			Units					
	Hundred thousands			Ten thousands			Hundreds			Tens			Units					
	Hundred thousands			Ten thousands			Hundreds			Tens			Units					
	Hundred thousands			Ten thousands			Hundreds			Tens			Units					

The first six figures from the right hand are called the *unit period*, the next six the *million period*, after which the *trillion*, *quadrillion*, *quintillion*, *sextillion*, *septillion*, *octillion* and *nonillion* periods follow in their order.

It is proper to divide any number, before we reckon it, into periods and half periods, by different marks. We then begin at the left hand, and read the figures in their order, with the names of their places, from the table. In writing any number, we must be careful to mark the figures in their proper places, and supply the vacant places with cyphers.

As there are no possible ways of changing numbers, except by enlarging or diminishing them according to some given rule, it follows, that the whole art of arithmetic is comprehended in two operations, *Addition* and *Subtraction*. However, as it is frequently required to add several equal numbers together, or to subtract several equal ones from a greater, till it be exhausted, proper methods have been invented for facilitating the operation in these cases, and distinguished by the names of *Multiplication* and *Division*; and these four rules are the foundation of all arithmetical operations whatever.

As the idea of number is acquired by observing several objects collected, so is that of fractions by observing an object divided into several parts. As we sometimes meet with objects broken into two, three, or more parts, we may consider any or all of these divisions promiscuously, which is done in the doctrine of vulgar fractions, for which a chapter will be allotted. However, since the practice of collecting units into parcels of tens has prevailed universally, it has been

found convenient to follow a like method in the consideration of fractions, by dividing each unit into ten equal parts, and each of these into ten smaller parts; and so on. Numbers divided in this manner are called *Decimal Fractions*.

CHAP. II. ADDITION.

8

ADDITION is that operation by which we find the amount of two or more numbers. The method of doing this in simple cases is obvious, as soon as the meaning of number is known, and admits of no illustration. A young learner will begin at one of the numbers and reckon up as many units separately as there are in the other, and practice will enable him to do it at once. It is impossible, strictly speaking, to add more than two numbers at a time. We must first find the sum of the first and second; then we add the third to that number; and so on. However, as the several sums obtained are easily retained in the memory, it is neither necessary nor usual to mark them down. When the numbers consist of more figures than one, we add the units together, the tens together; and so on. But, if the sum of the units exceed ten, or contain ten several times, we add the number of tens it contains to the next column, and only set down the number of units that are over. In like manner, we carry the tens of every column to the next higher. And the reason of this is obvious from the value of the places; since an unit, in any higher place, signifies the same thing as ten in the place immediately lower.

RULE. "Write the numbers distinctly,
"units under units, tens under tens; and
"so on. Then reckon the amount of the
"right-hand column. If it be under ten,
"mark it down. If it exceed ten, mark
"the units only, and carry the tens to the
"next place. In like manner, carry the
"tens of each column to the next, and
"mark down the full sum of the left-hand
"column."

Example.

346863
876734
123467
314213
712316
438987
279054

3092234

24433

As it is of great consequence in business to perform addition readily and exactly, the learner ought to practise it till it become quite familiar. If the learner can readily add any two digits, he will soon add a digit to a higher number with equal ease. It is only to add the unit place of that number to the digit; and, if it exceed ten, it raises the amount accordingly. Thus, because 8 and 6 is 14, 48 and 6 is 54. It will be proper to mark down under the sums of each column, in a small hand, the figure that is carried to the next column. This prevents the trouble of going over the whole operation again, in case of interruption or mistake. If you want to keep the account clean, mark down the sum and figure you carry, on a separate paper, and, after revising them, transcribe the sum only. After some practice, we ought to acquire the habit of adding two or more figures at one glance. This is particularly useful when two figures which amount to 10, as 6 and 4, or 7 and 3, stand together in the column.

Every operation in arithmetic ought to be revised, to prevent mistakes; and, as one is apt to fall into the same mistake if he revise it in the same manner he performed it, it is proper either to alter the order, or else to trace back the steps by which the operation advanced,

Addition. ced, which will lead us at last to the number we began with. Every method of proving accounts may be referred to one or other of these heads.

1st. Addition may be proven by any of the following methods : repeat the operation, beginning at the top of the column, if you began at the foot when you wrought it.

2^d. Divide the account into several parts; add these separately, and then add the sums together. If their amount correspond with the sum of the account, when added at once, it may be presumed right. This method is particularly proper when you want to know the sums of the parts, as well as that of the whole.

3^d. Subtract the numbers successively from the sum; if the account be right, you will exhaust it exactly, and find no remainder.

When the given number consists of articles of different value, as pounds, shillings, and pence, or the like, which are called *different denominations*, the operations in arithmetic must be regulated by the value of the articles. We shall give here a few of the most useful tables for the learners information.

I. Sterling Money.

4 Farthings=1 penny, marked d.

12 Pence=1 shilling, s.

20 Shillings=1 pound, L.

Alfo, 6s. 8d.=1 noble

10s.=1 angel

13s. 4d. or two thirds of a pound=1 merk.

Scots money is divided in the same manner as Sterling, and has one twelfth of its value. A pound Scots is equal to 1s. 8d. Sterling, a shilling Scots to a penny Sterling, and a penny Scots to a twelfth part of a penny Sterling; a mark Scots is two thirds of a pound Scots, or 13 $\frac{1}{3}$ d. Sterling.

III. Troy Weight.

20 Mites=1 grain, gr.

24 Grains=1 pen. w^t, dwz.

20 Pennyw^t=1 ounce, oz.

12 Ounces=1 pound, lb.

V. English Dry Measure.

2 Pints=1 quart

4 Quarts=1 gallon

2 Gallons=1 peck

4 Pecks=1 bushel

8 Bushels=1 quarter

VII. English Land Measure.

30 $\frac{1}{2}$ Square yards=1 pole or perch

40 Poles=1 rood

4 Roods=1 acre

IX. Long Measure.

12 Inches=1 foot

3 Feet=1 yard

5 $\frac{1}{2}$ Yards=1 pole

40 Poles=1 furlong

8 Furlongs=1 mile

3 Miles=1 league.

RULE for compound Addition. "Arrange like quantities under like, and carry according to the value of the higher place."

Note 1. When you add a denomination, which con-

tains more columns than one, and from which you carry to the higher by 20, 30, or any even number of tens, first add the units of that column, and mark down their sum, carrying the tens to the next column; then add the tens, and carry to the higher denomination, by the number of tens that it contains of the lower. For example, in adding shillings, carry by 10 from the units to the tens, and by 2 from the tens to the pounds.

Note 2. If you do not carry by an even number of tens, first find the complete sum of the lower denomination, then inquire how many of the higher that sum contains, and carry accordingly, and mark the remainder, if any, under the column. For example, if the sum of a column of pence be 43, which is three shillings and seven pence, mark 7 under the pence-column, and carry 3 to that of the shillings.

Note 3. Some add the lower denominations after the following method: when they have reckoned as many as amounts to one of the higher denomination, or upwards, they mark a dot, and begin again with the excess of the number reckoned above the value of the denomination. The number of dots shows how many are carried, and the last reckoned number is placed under the column.

Examples in Sterling Money.

L	145	6	8	L	16	9	11 $\frac{1}{2}$
	215	3	9		169	16	10
	172	18	4		36	12	9 $\frac{1}{2}$
	645	7	7		54	7	6
	737	2	3		30	—	1 $\frac{1}{2}$
	35	3	9		7	19	6
	9	—	7		707	19	11
	1764	12	3		14	14	4
	780	—	—		84	18	8 $\frac{1}{2}$
	99	9	9		125	3	7
	150	10	—		16	16	8 $\frac{1}{2}$
	844	8	7		62	5	3

In Averdupois Weight.				T. C. gr. lb.			
T.	C.	gr.	lb.	T.	C.	gr.	lb.
1	19	3	26	3	15	2	22
—	14	1	16	6	3	—	19
2	18	1	16	5	7	3	26
—	1	2	27	3	2	—	—
3	9	—	10	4	3	1	10
—	17	2	24	—	18	1	12
—	15	3	18	1	1	1	1
4	6	—	5	5	3	—	7
—	6	3	9	6	4	—	9
6	4	—	4	4	6	—	5
5	5	—	5	—	1	3	4

When one page will not contain the whole account, we add the articles it contains, and write against their sum, *Carried forward*; and we begin the next page with the sum of the foregoing, writing against it, *Brought forward*.

When the articles fill several pages, and their whole sum is known, which is the case in transcribing accounts, it is best to proceed in the following manner: Add the pages, placing the sums on a separate paper; then add the sums, and if the amount of the whole be right, it only remains to find what numbers should be placed at

Subtraction.

Subtraction. the foot and top of the pages. For this purpose, repeat the sum of the first page on the same line; add the sums of the first and second, placing the amount in a line with the second; to this add the sum of the third, placing the amount in a line with the third. Proceed in like manner with the others; and if the last sum corresponds with the amount of the pages, it is right. These sums are transcribed at the foot of the respective pages, and tops of the following ones.

Examples.

[illegible]

Then we transcribe L 778 : 16s. at the foot of the first and top of the second pages, L 1224 : 10 : 5 at the foot of the second and top of the third; and so on.

CHAP. III. SUBTRACTION.

SUBTRACTION is the operation by which we take a lesser number from a greater, and find their differences. It is exactly opposite to addition, and is performed by learners in a like manner, beginning at the greater and reckoning downwards the units of the lesser. The greater is called the *minuend*, and the lesser the *subtrahend*.

If any figure of the subtrahend be greater than the corresponding figure of the minuend, we add ten to that of the minuend; and, having found and marked the difference, we add one to the next place of the subtrahend. This is called *borrowing ten*. The reason will appear, if we consider that, when two numbers are equally increased by adding the same to both, their difference will not be altered. When we proceed as directed above, we add ten to the minuend, and we likewise add one to the higher place of the subtrahend, which is equal to ten of the lower place.

RULE. "Subtract units from units, tens from tens, and so on. If any figure of the subtrahend be greater than the corresponding one of the minuend, borrow 'ten.'"

<i>Example.</i>	Minuend	173694	738641
	Subtrahend	21453	379235
		<hr/>	<hr/>
	Remainder	152241	359406

To prove subtraction, add the subtrahend and remainder together ; if their sum be equal to the minuend, the account is right.

Or subtract the remainder from the minuend. If the difference be equal to the subtrahend, the account is right.

RULE for compound subtraction. "Place like denominations under like, and borrow, when necessary, according to the value of the higher place." Subtraction.

Examples.

			<i>Examples.</i>			<i>A.</i>	<i>R.</i>	<i>F.</i>	<i>E.</i>
			<i>C.</i>	<i>qr.</i>	<i>lb.</i>				
L 146	3	3	12	3	19	15	2	24	18
58	7	6	4	3	24	12	2	36	7

L 87 15 9 7 3 23 2 3 28 11

Note 1. The reason for borrowing is the same as in simple subtraction. Thus, in subtracting pence, we add 12 pence when necessary to the minuend, and at the next step, we add one shilling to the subtrahend.

Note 2. When there are two places in the same denomination, if the next higher contain exactly so many tens, it is best to subtract the units first, borrowing ten when necessary; and then subtract the tens, borrowing, if there is occasion, according to the number of tens in the higher denomination.

Note 3. If the value of the higher denomination be not an even number of tens, subtract the units and tens at once, borrowing according to the value of the higher denomination.

Note 4. Some chuse to subtract the place in the subtrahend, when it exceeds that of the minuend, from the value of the higher denomination, and add the minuend to the difference. This is only a different order of proceeding, and gives the same answer.

Note 5. As custom has established the method of placing the subtrahend under the minuend, we follow it when there is no reason for doing otherwise; but the minuend may be placed under the subtrahend with equal propriety; and the learner should be able to work it either way, with equal readiness, as this last is sometimes more convenient; of which instances will occur afterwards.

Note 6. The learner should also acquire the habit, when two numbers are marked down, of placing such a number under the lesser, that, when added together, the sum may be equal to the greater. The operation is the same as subtraction, though conceived in a different manner, and is useful in balancing accounts, and on other occasions.

It is often necessary to place the sums in different columns, in order to exhibit a clear view of what is required. For instance, if the values of several parcels of goods are to be added, and each parcel consists of several articles, the particular articles should be placed in an inner column, and the sum of each parcel extended to the outer column, and the total added there.

If any person be owing an account, and has made some partial payments, the payments must be placed in an inner column, and their sum extended under that of the account in the outer column, and subtracted there.

An example or two will make this plain.

1 ^{ts} .]	30 yards linen at 2 s.	L. 3		
45 ditto	at 1 s. 6 d.	3	7	6
			L. 6	7
120 lb thread at 4 s.	L. 24			
40 ditto at 3 s.	6			
30 ditto at 2 s. 6 d.	3	15		
			33	15
			L. 40	2

24.7

Multipli- cation.	2d.] 1773.		
	Jan. 15.	Lent James Smith L. 50	
		22. Lent him further 70	
			L. 120
	Feb. 3.	Received in part L. 62	
		5. Received further	
		In gold L. 10 10	
		In silver 13	
			23 10
			85 10
		Balance due me L. 34 10	

20

CHAP. IV. MULTIPLICATION.

IN Multiplication, two numbers are given, and it is required to find how much the first amounts to, when reckoned as many times as there are units in the second. Thus, 8 multiplied by 5, or 5 times 8, is 40. The given numbers (8 and 5) are called *factors*; the first (8) the *multiplicand*; the second (5) the *multiplier*; and the amount (40) the *product*.

This operation is nothing else than addition of the same number several times repeated. If we mark 8 five times under each other, and add them, the sum is 40: But, as this kind of addition is of frequent and extensive use, in order to shorten the operation, we mark down the number only once, and conceive it to be repeated as often as there are units in the multiplier.

For this purpose, the learner must be thoroughly acquainted with the following multiplication-table, which is composed by adding each digit twelve times.

Twice	Thrice	Four times	Five times	Six times	Seven times
1 is 2	1 is 3	1 is 4	1 is 5	1 is 6	1 is 7
2 4	2 6	2 8	2 10	2 12	2 14
3 6	3 9	3 12	3 15	3 18	3 21
4 8	4 12	4 16	4 20	4 24	4 28
5 10	5 15	5 20	5 25	5 30	5 35
6 12	6 18	6 24	6 30	6 36	6 42
7 14	7 21	7 28	7 35	7 42	7 49
8 16	8 24	8 32	8 40	8 48	8 56
9 18	9 27	9 36	9 45	9 54	9 63
10 20	10 30	10 40	10 50	10 60	10 70
11 22	11 33	11 44	11 55	11 66	11 77
12 24	12 36	12 48	12 60	12 72	12 84
Eight times	Nine times	Ten times	Eleven times	Twelve times	
1 is 8	1 is 9	1 is 10	1 is 11	1 is 12	
2 16	2 18	2 20	2 22	2 24	
3 24	3 27	3 30	3 33	3 36	
4 32	4 36	4 40	4 44	4 48	
5 40	5 45	5 50	5 55	5 60	
6 48	6 54	6 60	6 66	6 72	
7 56	7 63	7 70	7 77	7 84	
8 64	8 72	8 80	8 88	8 96	
9 72	9 81	9 90	9 99	9 108	
10 80	10 90	10 100	10 110	10 120	
11 88	11 99	11 110	11 121	11 132	
12 96	12 108	12 120	12 132	12 144	

If both factors be under 12, the table exhibits the product at once. If the multiplier only be under 12, we begin at the unit-place, and multiply the figures in their order, carrying the tens to the higher place, as in addition.

Ex. 76859 multiplied by 4, or 76859 added 4 times.	
4	76859
	76859
	76859
307436	76859
	307436

If the multiplier be 10, we annex a cypher to the multiplicand. If the multiplier be 100, we annex two cyphers; and so on. The reason is obvious, from the use of cyphers in notation.

If the multiplier be any digit, with one or more cyphers on the right hand, we multiply by the figure, and annex an equal number of cyphers to the product. Thus, if it be required to multiply by 50, we first multiply by 5, and then annex a cypher. It is the same thing as to add the multiplicand fifty times; and this might be done by writing the account at large, dividing the column into 10 parts of 5 lines, finding the sum of each part, and adding these ten sums together.

If the multiplier consist of several significant figures, we multiply separately by each, and add the products. It is the same as if we divided a long account of addition into parts corresponding to the figures of the multiplier.

Example.		To multiply 7329 by 365.	
7329	7329	7329	36645 = 5 times.
5	60	300	439740 = 60 times.
			2198700 = 300 times.
36645	439740	2198700	
			2675085 = 365 times.

It is obvious that 5 times the multiplicand added to 60 times, and to 300 times, the same must amount to the product required. In practice, we place the products at once under each other; and, as the cyphers arising from the higher places of the multiplier are lost in the addition, we omit them. Hence may be inferred the following

RULE. "Place the multiplier under the multiplicand, and multiply the latter successively by the significant figures of the former; placing the right-hand figure of each product under the figure of the multiplier from which it arises; then add the product."

Ex. 7329	42785	37846	93956
365	91	235	8704
36645	42785	189230	375824
43974	385065	113538	657692
21987		75692	751648
2675085	3893431	8893810	817793024

A number which cannot be produced by the multiplication of two others is called a *prime number*; as 3, 5, 7, 11, and many others.

A number which may be produced by the multiplication of two or more smaller ones, is called a *composite number*. For example, 27, which arises from the multiplication of 9 by 3; and these numbers (9 and 3) are called the *component parts* of 27.

Contractions and Varieties in Multiplication.

First, If the multiplier be a composite number, we may multiply successively by the component parts.

Ex.

Multipli-
cation.

Ex. 7638 by 45 or 5 times 9	7638 1 st , 5492 by 72
45	9 2 ^d , 13759 by 56
	3 ^d , 56417 by 144
38190	68742 4 th , 73048 by 84
30552	5 5 th , 166549 by 125
	6 th , 378914 by 54
343710	343710 7 th , 520813 by 63

Because the second product is equal to five times the first, and the first is equal to nine times the multiplicand, it is obvious that the second product must be five times nine, or forty-five times as great as the multiplicand.

Secondly, If the multiplier be 5, which is the half of 10, we may annex a cypher and divide by 2. If it be 25, which is the fourth part of an 100, we may annex two cyphers, and divide by 4. Other contractions of the like kind will readily occur to the learner.

Thirdly, To multiply by 9, which is one less than 10, we may annex a cypher; and subtract the multiplicand from the number it composes. To multiply by 99, 999, or any number of 9's, annex as many cyphers, and subtract the multiplicand. The reason is obvious; and a like rule may be found, though the unit place be different from 9.

Fourthly, Sometimes a line of the product is more easily obtained from a former line of the same than from the multiplicand.

Ex. 1 st .] 1372	2 ^d .] 1348
84	36
5488	8088
10976	4044
115248	48528

In the first example, instead of multiplying by 5, we may multiply 5488 by 2; and, in the second, instead of multiplying by 3, we may divide 8088 by 2.

Fifthly, Sometimes the product of two or more figures may be obtained at once, from the product of a figure already found.

Ex. 1 st .] 14356	2 ^d .] 3462321
648	96484
114848	13849284
918784	166191408
9302688	332382816
	334058579364

In the second example, we multiply first by 4; then, because 12 times 4 is 48, we multiply the first line of the product by 12, instead of multiplying separately by 8 and 4; lastly, because twice 48 is 96, we multiply the second line of the product by 2, instead of multiplying separately by 6 and 9.

When we follow this method, we must be careful to place the right-hand figure of each product under the right-hand figure of that part of the multiplier which it is derived from.

It would answer equally well in all cases, to begin the work at the highest place of the multiplier; and contractions are sometimes obtained by following that order.

Multipli-
cation.

Ex. 1 st .] 3125	or 7125	2 ^d .] 32452
642	642	52575
18750	18750	162260
12500	131250	811300
6250		2433900
2006250	2006250	
		1706163900

It is a matter of indifference which of the factors be used as the multiplier; for 4 multiplied by 3 gives the same product as 3 multiplied by 4; and the like holds universally true. To illustrate this, we may mark three rows of points, four in each row, placing the rows under each other; and we shall also have four rows, con- taining three points each, if we reckon the rows downwards.

Multiplication is proven by repeating the operation, using the multiplier for the multiplicand, and the multiplicand for the multiplier. It may also be proven by division, or by calling out the 9's; of which afterwards, and an account, wrought by any contraction, may be proven by performing the operation at large, or by a different contraction.

Compound Multiplication.

RULE I. "If the multiplier do not exceed 12, the operation is performed at once, beginning at the lowest place, and carrying according to the value of the higher place."

[Examples.]	Cwt.	qr.	lb.	A.	R.	P.	lb.	oz.	dwt.
L. 13 6 7	12	2	8	13	3	18	7	5	9
	9		5			6			12

RULE II. "If the multiplier be a composite number, whose component parts do not exceed 12, multiply first by one of these parts, then multiply the product by the other. Proceed in the same manner if there be more than two."

Ex. 1 st .] L. 15 3 8 by 32=8X4
L. 121 9 4 = 8 times
L. 485 17 4 = 32 times.
2 ^d .] L. 17 3 8 by 75=5X5X3
L. 51 11 — = 3 times
L. 257 15 — = 15 times
L. 1288 15 — = 75 times

Note 1. Although the component parts will answer in any order, it is best, when it can be done, to take them in such order as may clear off some of the lower places at the first multiplication, as is done in Ex. 2^d.

Note

Multiplication.

Division.

Table 2. The operation may be proved, by taking the component parts in a different order, or dividing the multiplier in a different manner.

RULE III. " If the multiplier be a prime number, " multiply first by the composite number next lower, " then by the difference, and add the products."

L. 35 17 9 by 67=64x3 Here, because 8 times 8 64=8x8 is 64, we multiply twice

L. 287 2 — = 8 times. by 8, which gives L. 2296 16s. equal to 64 times the multiplicand; then we find the amount of 3 times the

L. 2296 16 — = 64 times. multiplicand, which is 107 13 3 = 3 times. L. 107 : 13 : 3; and it is evident that these added,

L. 2404 9 3 = 67 times. amount to 67, the multiplicand.

RULE IV. " If there be a composite number a little above the multiplier, we may multiply by that number, and by the difference, and subtract the second product from the first."

L. 17 4 5 by 106=108-2 Here we multiply by 12 and 9, the component parts of 108, and obtain a product of L. 1860 : 6s. equal to 108 times the multiplicand; and, as this is twice oftener than was required, we subtract the multiplicand doubled, and the remainder is the number sought.

L. 206 13 — 9

L. 1859 17 — = 108 times. 34 8 10 = 2 times.

L. 1825 8 2 = 106 times.

Example. L. 34 8 2½ by 3465

RULE V. " If the multiplier be large, multiply by 10, and multiply the product again by 10; by which means you obtain an hundred times the given number.

" If the multiplier exceed 1000, multiply by 10 again; and continue it farther if the multiplier require it; then multiply the given number by the unit-place of the multiplier; the first product by the ten-place, the second product by the hundred-place; and so on. " Add the products thus obtained together."

L. 34 8 2½ by 5 = L. 172 1 ½ = 5 times

10 times L. 344 2 1 by 6 = 2064 12 6 = 60 times

100 times L. 3441 — 10 by 4 = 13764 3 4 = 400 times

1000 times L. 34410 8 4 by 3 = 103231 5 = 3000 times

L. 119232 1 10½ = 3465 times

The use of multiplication is to compute the amount of any number of equal articles, either in respect of measure, weight, value, or any other consideration. The multiplicand expresses how much is to be reckoned for each article; and the multiplier expresses how many times that is to be reckoned. As the multiplier points out the number of articles to be added, it is always an abstract number, and has no reference to any value or measure whatever. It is therefore quite improper to attempt the multiplication of shillings by shillings, or to consider the multiplier as expressive of any denomination.

The most common instances in which the practice of this operation is required, are, to find the amount of any number of parcels, to find the value of any number of articles, to find the weight or measure of a number of articles, &c.

This computation, for changing any sum of money, weight, or measure, into a different kind, is called REDUCTION. When the given quantity is expressed in different denominations, we reduce the highest to the next lower, and add thereto the given number of that denomination; and proceed in like manner till we have reduced it to the lowest denomination.

Example. To reduce L. 46 : 13 : 8½ to farthings.

L. 46		Or thus :
20		
920 shillings in L. 46		L. 46 13 8½
13		20
933 shillings in L. 46 13		933
12		12
11196 pence in L. 46 13		11204
8		4
11204 pence in L. 46 13 8		44819
4		
44816 farthings in L. 46 13 8		
3		
44819 farthings in L. 46 13 8½		

It is easy to take in or add the higher denomination at the same time we multiply the lower.

CHAP. V. DIVISION.

11

In division, two numbers are given; and it is required to find how often the former contains the latter. Thus, it may be asked how often 21 contains 7, and the answer is exactly 3 times. The former given number (21) is called the *Dividend*; the latter (7) the *Divisor*; and the number required (3) the *Quotient*. It frequently happens that the division cannot be completed exactly without fractions. Thus it may be asked, how often 8 is contained in 19? the answer is twice, and a remainder of 3.

This operation consists in subtracting the divisor from the dividend, and again from the remainder, as often as it can be done, and reckoning the number of subtractions; as,

21	19
7 first subtraction	8 first subtraction
14	11
7 second subtraction	8 second subtraction
7	3 remainder.
7 third subtraction.	
0	

As this operation, performed at large, would be very tedious, when the quotient is a high number, it is proper to shorten it by every convenient method; and, for this purpose, we may multiply the divisor by any

Division. any number whose product is not greater than the dividend, and so subtract it twice or thrice, or oftener, at the same time. The best way is to multiply it by the greatest number, that does not raise the product too high, and that number is also the quotient. For example, to divide 45 by 7, we inquire what is the greatest multiplier for 7, that does not give a product above 45; and we shall find that it is 6; and 6 times 7 is 42, which, subtracted from 45, leaves a remainder of 3. Therefore 7 may be subtracted 6 times from 45; or, which is the same thing, 45, divided by 7, gives a quotient of 6, and a remainder of 3.

If the divisor do not exceed 12, we readily find the highest multiplier that can be used from the multiplication table. If it exceed 12, we may try any multiplier that we think will answer. If the product be greater than the dividend, the multiplier is too great; and, if the remainder, after the product is subtracted from the dividend, be greater than the divisor, the multiplier is too small. In either of these cases, we must try another. But the attentive learner, after some practice, will generally hit on the right multiplier at first.

If the divisor be contained oftener than ten times in the dividend, the operation requires as many steps as there are figures in the quotient. For instance, if the quotient be greater than 100, but less than 1000, it requires 3 steps. We first inquire how many hundred times the divisor is contained in the dividend, and subtract the amount of these hundreds. Then we inquire how often it is contained ten times in the remainder, and subtract the amount of these tens. Lastly, we inquire how many single times it is contained in the remainder. The method of proceeding will appear from the following example:

To divide	5936	8.
From	5936	
Take	5600	= 700 times 8
Rem.	336	
From which take	320	= 40 times 8
Rem.	16	
From which take	16	= 2 times 8
	0	742 times 8 in all.

It is obvious, that as often as 8 is contained in 59, so many hundred times it will be contained in 5900, or in 5936; and, as often as it is contained in 33, so many ten times it will be contained in 330, or in 336; and thus the higher places of the quotient will be obtained with equal ease as the lower. The operation might be performed by subtracting 8 continually from the dividend, which will lead to the same conclusion by a very tedious process. After 700 subtractions, the remainder would be 336; after 40 more, it would be 16; and after 2 more, the dividend would be entirely exhausted. In practice, we omit the cyphers, and proceed by the following

RULE. 1st, " Assume as many figures on the left hand of the multiplier as contain the divisor once or oftener: find how many times they contain it, and place the answer as the highest figure of the quotient. 2^d, " Multiply the divisor by the figure you have

found, and place the product under the part of the dividend from which it is obtained.

3^d, " Subtract the product from the figures above it."

4th, " Bring down the next figure of the dividend to the remainder, and divide the number it makes up, as before."

Examples.] 1 st . 8)5936(742	2 ^d . 63)30114(478
5600	25200
33	491
32	441
16	504
16	504
0	0
3 ^d . 365)974932(2671 ⁷ / ₃₅	
730000	
2449	
2190	
2593	
2555	
382	
365	

Remainder 17

The numbers which we divide, as 59, 33, and 16, in the first example, are called *dividends*.

It is usual to mark a point under the figures of the dividend, as they are brought down, to prevent mistakes.

If there be a remainder, the division is completed by a vulgar fraction, whose numerator is the remainder, and its denominator the divisor. Thus, in Ex. 3. the quotient is 2671, and remainder 17; and the quotient completed is 2671 ¹⁷/₃₅.

A number which divides another without a remainder is said to measure it; and the several numbers which measure another, are called its *aliquot parts*. Thus, 2, 4, 6, 8; and 12, are aliquot parts of 24. As it is often useful to discover numbers which measure others, we may observe,

1st, Every number ending with an even figure, that is, with 2, 4, 6, 8, or 0, is measured by 2.

2^d, Every number ending with 5, or 0, is measured by 5.

3^d, Every number, whose figures, when added, amount to an even number of 3's or 9's, is measured by 3 or 9, respectively.

Contractions and Varieties in Division.

First, When the divisor does not exceed 12, the whole computation may be performed without setting down any figures except the quotient.

Ex. 7)35868(5124 or 7)35868

Secondly, When the divisor is a composite number, and one of the component parts also measures the dividend, we may divide successively by the component parts,

Ex.

Division. Ex. 1st.] 30114 by 63.

$$\begin{array}{r} 9 \overline{)30114} \\ 7 \overline{)3346} \\ \hline \text{Quotient } 478 \end{array}$$

2^d.] 975 by 105=5×7×3

$$\begin{array}{r} 5 \overline{)975} \\ 3 \overline{)195} \\ 7 \overline{)65} \\ \hline \text{Quotient } 9\frac{2}{3} \end{array}$$

This method might be also used, although the component parts of the divisor do not measure the dividend; but the learner will not understand how to manage the remainder till he be acquainted with the doctrine of vulgar fractions.

Thirdly, When there are cyphers annexed to the divisor, cut them off, and cut off an equal number of figures from the dividend; annex these figures to the remainder. Ex. To divide 378643 by 5200.

$$\begin{array}{r} 52 \overline{)378643} \quad 43 \left(72\frac{1}{2} \right) \\ 364 \cdot \\ \hline 146 \\ 104 \\ \hline 4243 \end{array}$$

The reason will appear, by performing the operation at large, and comparing the steps.

To divide by 10, 100, 1000, or the like. Cut off as many figures on the right hand of the dividend as there are cyphers in the divisor. The figures which remain on the left hand compose the quotient, and the figures cut off compose the remainder.

Fourthly, When the divisor consists of several figures we may try them separately, by inquiring how often the first figure of the divisor is contained in the first figure of the dividend, and then considering whether the second and following figures of the divisor be contained as often in the corresponding ones of the dividend with the remainder (if any) prefixed. If not, we must begin again, and make trial of a lower number. When the remainder is nine, or upwards, we may be sure the division will hold through the lower places; and it is unnecessary to continue the trial farther.

Fifthly, We may make a table of the products of the divisor, multiplied by the nine digits, in order to discover more readily how often it is contained in each dividend. This is convenient when the dividend is very long, or when it is required to divide frequently by the same divisor.

73 by 2 = 146	73)53872694(737982
3 = 219	511.....
4 = 292	—
5 = 365	277
6 = 438	219
7 = 511	—
8 = 584	582
9 = 657	511
	—
	716
	657
	—
	599
	584
	—
	154
	146
	—

Rem. 8

Sixthly, To divide by 9, 99, 999, or any number

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of 9's, transcribe under the dividend part of the same, shifting the highest figure as many places to the right hand as there are 9's in the divisor. Transcribe it again, with the like change of place, as often as the length of the dividend admits; add these together, and cut off as many figures from the right hand of the sum as there are 9's in the divisor. The figures which remain on the left hand compose the quotient, and those cut off the remainder.

If there be any carriage to the unit-place of the quotient, add the number carried likewise to the remainder, as in Ex. 2.; and if the figures cut off be all 9's, add 1 to the quotient, and there is no remainder.

Examples. 1st.] 99)324123 2^d.] 99)547825

$$\begin{array}{r} 3241 \\ 32 \\ \hline 3273 \overline{)96} \end{array} \quad \begin{array}{r} 5478 \\ 5478 \\ \hline 5533 \overline{)57} \\ 1 \end{array}$$

Quotient 3273 and rem. 96.

Quotient 5533.58 rem.

3^d.] 999)476523

$$\begin{array}{r} 476 \\ 476 \overline{)999} \\ 1 \end{array}$$

Quotient 477

To explain the reason of this, we must recollect, that whatever number of hundreds any dividend contains, it contains an equal number of 99's, together with an equal number of units. In Ex. 1. the dividend contains 3241 hundreds, and a remainder of 23. It therefore contains 3241 times 99, and also 3241 besides the remainder already mentioned. Again, 3241 contains 32 hundreds, and a remainder of 51: it therefore contains 32 99's, and also 32, besides the remainder of 41. Consequently the dividend contains 99, altogether, 3241 times, and 32 times, that is 3273 times, and the remainder consists of 23, 41, and 32, added, which makes 96.

As multiplication supplies the place of frequent additions, and division of frequent subtractions, they are only repetitions and contractions of the simple rules, and when compared together, their tendency is exactly opposite. As numbers, increased by addition, are diminished and brought back to their original quantity by subtraction; in like manner, numbers compounded by multiplication are reduced by division to the parts from which they were compounded. The multiplier shows how many additions are necessary to produce the number; and the quotient shows how many subtractions are necessary to exhaust it. It follows that the product, divided by the multiplicand, will quote the multiplier; and, because either factor may be assumed for the multiplicand, therefore the product, divided by either factor, quotes the other. It follows, also, that the dividend is equal to the product of the divisor and quotient multiplied together; and hence these operations mutually prove each other.

To prove multiplication. Divide the product by either factor. If the operation be right, the quotient is the other factor, and there is no remainder.

To prove division. Multiply the divisor and quotient together; to the product add the remainder, if any; and, if the operation be right, it makes up the dividend.

4 O

Division.

Division.

As Portuguese money frequently passes here in payments, we shall give a table of the pieces, and their value.

A moidore	=	L.1	7	—
A half moidore	=	—	13	6
A quarter moidore	=	—	6	9
A double Joannes	=	3	12	—
A Joannes	=	1	16	—
A half ditto	=	—	18	—
A quarter ditto	=	—	9	—
An eighth ditto	=	—	4	6

Note 1. Guineas may be reduced to pounds, by adding one twentieth part of the number.

2. Pounds may be reduced to merks by adding one half.

3. Merks may be reduced to pounds by subtracting one third.

4. Four moidores are equal to three Joannes: wherefore moidores may be reduced to Joannes, by subtracting one fourth; and Joannes to moidores, by adding one third.

5. Five Joannes are equal to L.9. Hence it is easy to reduce Portuguese money to Sterling.

Another case, which requires both multiplication and division, is, when the value, weight, measure, or duration of any quantity is given, and the value, &c. of a different quantity required, we first find the value, &c. of a single article by division, and then the value, &c. of the quantity required, by multiplication.

Ex. If 3 yards cost 15 s. 9 d. what will 7 yards cost, at the same rate?

s.	d.
3) 15	9 Price of 3 yards.
5	3 Price of 1 yard by Rule IV. p. 659.
7	

L. 1 16 9 Price of 7 yards (by par. 1. p. 662. col. 2.)

Many other instances may be adduced, where the operation and the reason of it are equally obvious. These are generally, though unnecessarily, referred to the rule of proportion.

We shall now offer a general observation on all the operations in arithmetic. When a computation requires several steps, we obtain a just answer, whatever order we follow. Some arrangements may be preferable to others in point of ease, but all of them lead to the same conclusion. In addition, or subtraction, we may take the articles in any order, as is evident from the idea of number; or, we may collect them into several sums, and add or subtract these, either separately or together. When both the simple operations are required to be repeated, we may either complete one of them first, or may introduce them promiscuously; and the compound operations admit of the same variety. When several numbers are to be multiplied together, we may take the factors in any order, or we may arrange them into several classes, and find the product of each class, and then multiply the products together. When a number is to be divided by several others, we may take the divisors in any order, or we may multiply them into each other, and divide by the product; or we may multiply them into several parcels, and divide by the products successively. Lastly, when multiplication and division are both required, we may begin with either; and, when both are repeatedly necessary, we may collect

the multipliers into one product, and the divisors into one another; or, we collect them into parcels, or use them singly, and that in any order. Still, we shall obtain the proper answer, if none of the terms be neglected.

When both multiplication and division are necessary to obtain the answer of a question, it is generally best to begin with the multiplication, as this order keeps the account as clear as possible from fraction. The example last given may be wrought accordingly as follows:

s.	d.
15	9
7	
3) 15	10 3
1	16 9

Some accountants prove the operations of arithmetic by a method which they call casting out the 9's, depending on the following principles:

First, if several numbers be divided by any divisor, (the remainders being always added to the next number), the sum of the quotients, and the last remainder, will be the same as those obtained when the sum of the numbers is divided by the same divisor. Thus, 19, 15, and 23, contain, together, as many 9's, as many 7's, &c. as their sum 57 does, and the remainders are the same; and, in this way, addition may be proven by division. It is from the correspondence of the remainders, that the proof, by casting out the 9's, is deduced.

Secondly, If any figure, with cyphers annexed, be divided by 9, the quotient consists entirely of that figure; and the remainder is also the same. Thus, 40, divided by 9, quotes 4, remainder 4; and 400, divided by 9, quotes 44, remainder 4. The same holds with all the digits; and the reason will be easily understood; every digit, with a cypher annexed, contains exactly so many tens; it must therefore contain an equal number of 9's, besides a remainder of an equal number of units.

Thirdly, If any number be divided by 9, the remainder is equal to the sum of the figures of the number, or to the remainder obtained, when that sum is divided by 9. For instance, 3765, divided by 9, leave a remainder of 3, and the sum of 3, 7, 6, and 5, is 21; which, divided by 9, leaves a remainder of 3. The reason of this will appear from the following illustration:

3000	divided by 9	quotes 333;	remainder 3
700		quotes 77;	remainder 7
60		quotes 6;	remainder 6
5		quotes 0;	remainder 5
3765			
416	Sum of rem.	21	
Again; 21	divided by 9	quotes 2;	remainder 3

Wherefore, 3765 divid. by 9 quotes 418; remainder 3; for the reason given. Hence we may collect the following rules for practice:

To cast the 9's out of any number, or to find what remainder will be left when any number is divided by 9: Add the figures; and, when the sum exceeds 9, add the figures which would express it. Pass by the 9's; and, when the sum comes exactly to 9, neglect it, and begin anew. For example, if it be required to cast the 9's out of 3573294, we reckon thus: 3 and 4 0 2 5 is

Division. 5 is 8, and 7 is 15; 1 and 5 is 6, and 3 is 9, which we neglect; 2 and (passing by 9), 4 is 6; which is the remainder or *Result*. If the article out of which the 9's are to be cast contains more denominations than one, we cast the 9's out of the higher, and multiply the result by the value of the lower, and carry on the product (casting out the 9's, if necessary), to the lower.

To prove addition, cast the 9's out of the several articles, carrying the results to the following articles; cast them also out of the sum. If the operation be right, the results will agree.

To prove subtraction, cast the 9's out of the minuend; cast them also out of the subtrahend and remainder together; and if you obtain the same result, the operation is presumed right.

To prove multiplication, cast the 9's out of the multiplicand, and also out of the multiplier, if above 9. Multiply the results together, and cast the 9's, if necessary, out of their product. Then cast the 9's out of the product, and observe if this result correspond with the former.

Ex. 1st.] 9276 ref. 6X8=48 ref. 3.

74208 ref. 3.

2^d.] 7898 ref. 5X3=15 ref. 6.
48 ref. 3

63184
31592

379104 ref. 6.

The reason of this will be evident, if we consider multiplication under the view of repeated addition. In the first example it is obviously the same. In the second, we may suppose the multiplicand repeated 48 times. If this be done, and the 9's cast out, the result, at the end of the 9th line, will be 0; for any number, repeated 9 times, and divided by 9, leaves no remainder. The same must happen at the end of the 18th, 27th, 36th, and 45th lines; and the last result will be the same as if the multiplicand had only been repeated 3 times. This is the reason for casting out the 9's from the multiplier as well as the multiplicand.

To prove division, cast the 9's out of the divisor, and also out of the quotient; multiply the results, and cast the 9's out of the product. If there be any remainder, add to it the result, casting out the 9's, if necessary. If the account be right, the last result will agree with that obtained from the dividend.

Ex. 42) 2490 (59 ref. 5X6=30 ref. 3.
ref. 6 210

390
378

Rem. 12 ref. 5.

And the result of the dividend is 6

This depends on the same reason as the last; for the dividend is equal to the product of the divisor and

quotient added to the remainder.

We cannot recommend this method, as it lies under the following disadvantages:

First, If an error of 9, or any of its multiples, be committed, the results will nevertheless agree; and so the error will remain undiscovered. And this will always be the case, when a figure is placed or reckoned in a wrong column; which is one of the most frequent causes of error.

Secondly, When it appears by the disagreement of the results, that an error has been committed, the particular figure or figures in which the error lies are not pointed out; and, consequently, it is not easily corrected.

CHAP. VI. RULE OF PROPORTION.

SECT. I. SIMPLE PROPORTION.

13

QUANTITIES are reckoned proportional to each other, when they are connected in such a manner, that, if one of them be increased or diminished, the other increases or diminishes at the same time; and the degree of the alteration on each is a like part of its original measure; thus four numbers are in the same proportion, the first to the second as the third to the fourth, when the first contains the second, or any part of it, as often as the third contains the fourth, or the like part of it. In either of these cases, the quotient of the first, divided by the second, is equal to that of the third divided by the fourth; and this quotient may be called the *measure of the proportion*.

Proportionals are marked down in the following manner:

6 : 3 :: 8 : 4
12 : 36 :: 9 : 27
9 : 6 :: 24 : 18
16 : 24 :: 10 : 15

The rule of proportion directs us, when three numbers are given, how to find a fourth, to which the third may have the same proportion that the first has to the second. It is sometimes called the *Rule of Three*, from the three numbers given; and sometimes the *Golden Rule*, from its various and extensive utility.

RULE. "Multiply the second and third terms together, and divide the product by the first."

Ex. To find a fourth proportional to 18, 27, and 34.

18 : 27 :: 34 : 51

34
108
81
18)918(51
90
18
18
0

To explain the reason of this, we must observe, that, if two or more numbers be multiplied or divided alike, the products or quotients will have the same proportion.

18 : 27
Multiplied by 34, 612 : 918
Divided by 18, 34 : 51

The

Proportion.

The products 612, 918, and the quotients 34, 51, have therefore the same proportion to each other that 18 has to 27. In the course of this operation, the products of the first and third term is divided by the first; therefore the quotient is equal to the third.

The first and second terms must always be of the same kind; that is, either both monies, weights, measures, both abstract numbers, or the like. The fourth, or number sought, is of the same kind as the third.

When any of the terms is in more denominations than one, we may reduce them all to the lowest. But this is not always necessary. The first and second should not be reduced lower than directed p. 662, col. 1. par. ult.; and, when either the second or third is a simple number, the other, though in different denominations, may be multiplied without reduction.

$$\begin{array}{r} \text{L. s. d.} \\ \text{Ex. } 5 : 7 :: 25 \quad 11 \quad 3 \\ \hline \qquad \qquad \qquad 7 \\ \hline \text{L. s. d.} \\ 5)178 \quad 18 \quad 9(35 \quad 19 \quad 9 \end{array}$$

The accountant must consider the nature of every question, and observe the circumstance which the proportion depends on; and common sense will direct him to this, if the terms of the question be understood. It is evident that the value, weight, and measure of any commodity is proportioned to its quantity; that the amount of work or consumption is proportioned to the time; that gain, loss, or interest, when the rate and time are fixed, is proportioned to the capital sum from which it arises; and that the effect produced by any cause is proportioned to the extent of the cause. In these, and many other cases, the proportion is direct, and the number sought increases or diminishes along with the term from which it is derived.

In some questions, the number sought becomes less, when the circumstances from which it is derived become greater. Thus, when the price of goods increases, the quantity which may be bought for a given sum is smaller. When the number of men employed at work is increased, the time in which they may complete it becomes shorter; and, when the activity of any cause is increased, the quantity necessary to produce a given effect is diminished. In these, and the like, the proportion is said to be inverse.

GENERAL RULE for stating all questions, whether direct or inverse. "Place that number for the third term which signifies the same kind of thing with what is sought, and consider whether the number sought will be greater or less. If greater, place the least of the other terms for the first; but, if less, place the greatest for the first."

Ex. 1st.] If 30 horses plough 12 acres, how many will 42 plough in the same time?

$$\begin{array}{r} \text{H. H. A.} \\ 30 : 42 :: 12 \end{array}$$

Here, because the thing sought is a number of acres, we place 12, the given number of acres, for the third term; and, because 42 horses will plough more than 12, we make the lesser number 30, the first term, and the greater number, 42, the second term.

2^d.] If 40 horses be maintained for a certain sum on hay, at 5 d. per stone, how many will be maintained on the same sum when the price of hay ri-

ses to 8 d.

$$\begin{array}{r} \text{d. d. H.} \\ 8 : 5 :: 40 \end{array}$$

Here, because a number of horses is sought, we make the given number of horses, 40, the third term; and, because fewer will be maintained for the same money, when the price of hay is dearer, we make the greater price, 8 d. the first term; and the lesser price, 5 d. the second term.

The first of these examples is direct, the second inverse. Every question consists of a supposition and demand. In the first, the supposition is, that 30 horses plough 12 acres, and the demand, how many 42 will plough? and the first term of the proportion, 30, is found in the supposition, in this, and every other direct question. In the second, the supposition is, that 40 horses are maintained on hay at 5 d. and the demand, how many will be maintained on hay at 8 d? and the first term of the proportion, 8, is found in the demand, in this and every other inverse question.

When an account is stated, if the first and second term, or first and third, be measured by the same number, we may divide them by that measure, and use the quotients in their stead.

$$\begin{array}{r} \text{Ex. If 36 yards cost 42 shillings, what will 27 cost?} \\ \text{Y. Y. sh.} \\ 36 : 27 :: 42 \\ 4 : 3 :: 42 \\ \hline \qquad \qquad \qquad 3 \\ \hline \text{s. d.} \\ 4)126(31 \quad 6 \end{array}$$

Here 36 and 27 are both measured by 9, and we work with the quotients 4 and 3.

SECT. II. COMPOUND PROPORTION.

14

Sometimes the proportion depends upon several circumstances. Thus, it may be asked, if 18 men consume 6 bolls corn in 40 days, how many will 24 men consume in 56 days? Here the quantity required depends partly on the number of men, partly on the time, and the question may be resolved into the two following ones:

1st, If 18 men consume 6 bolls in a certain time, how many will 24 men consume in the same time?
M. M. B. B.
18 : 24 :: 6 : 8 Answer. 24 men will consume 8 bolls in the same time.

2^d, If a certain number of men consume 8 bolls in 28 days, how many will they consume in 56 days?
D. D. B. B.
28 : 56 :: 8 : 16 Ans. The same number of men will consume 16 bolls in 56 days?

$$28)448(16$$

In the course of this operation, the original number of bolls, 6, is first multiplied into 24, then divided by 18, then multiplied into 8, then divided by 28. It would answer the same purpose to collect the multipliers into one product, and the divisors into another; and then to multiply the given number of bolls by the former, and divide the product by the latter. p. 663. col. 1. par. ult.

The above question may therefore be stated and wrought as follows:

Men

Proportion. Men 18 : 24 :: 6 bulls
Days 28 : 56

144 144
36 120

504 1344
6

504)3064(16

"In general, state the several particulars on which the question depends, as so many simple proportions, attending to the sense of the question to discover whether the proportions should be stated directly or inversely; then multiply all the terms in the first rank together, and all those in the second rank together; and work with the products as directed in the simple rule (Sect. i. p. 664)."

Example. If 100 men make 3 miles of road in 27 days, in how many days will 150 men make 5 miles?

Men 150 : 100 :: 27 days

Miles 3 5
450 500
27

450)13500(30 days answer. require more days.

The following contraction is often useful. After stating the proportion, if the same number occurs in both ranks, dash it out from both; or, if any term in the first rank, and another in the second rank, are measured by the same numbers, dash out the original terms, and use the quotients in their stead.

Ex. If 18 men consume L. 30 value of corn in 9 months, when the price is 16s. per boll, how many will consume L. 54 value in 6 months, when the price is 12s. per boll? In this question, the proportion depends upon three particulars, the value of corn, the time, and the price. The first of which is direct, because the more the value of provisions is, the more time is required to consume them; but the second and third are inverse, for the greater the time and price is, fewer men will consume an equal value.

Value 30 : 54 :: 18 men

Months 9 : 6

Price 12 : 16

10 9

3 3

4

36

18

288

36

10)648(64 3/5 we dash them out, and work with the remaining terms, according to the rule.

The monies, weights, and measures, of different countries, may be reduced from the proportion which they bear to each other.

Ex. If 112 lb. averdupois make 104 lb. of Holland, and 100 lb. of Holland make 89 of Geneva, and 110 of Geneva make 117 of Seville, how many lbs. of Se-

Here we multiply 18 into 40 for a divisor, and 6 into the product of 24 by 56, for a dividend.

vile will make 100 lb. averdupois.

112 : 104 :: 100

100 : 89

110 : 117

If it be required, how many lb. averdupois will make 100 of Seville, the terms would have been placed in the different columns thus :

104 : 112 :: 100

89 : 100

117 : 110

Sect. iii. DISTRIBUTIVE PROPORTION.

15

If it be required to divide a number into parts, which have the same proportion to each other that several other given numbers have, we add these numbers together, and state the following proportion: As the sum is to the particular numbers, so is the number required to be divided to the several parts sought.

Ex. 1st.] Four partners engage to trade in company; A's stock is L. 150, B's L. 320, C's L. 350, D's L. 500, and they gain L. 730; Required how much belongs to each, if the gain be divided among them in proportion to their stocks?

A's stock L. 150	1320 : 150 :: 730 : L. 82	19	1	120	Rem.
B's 320	1320 : 320 :: 730 : 176	19	4	960	
C's 350	1320 : 350 :: 730 : 193	11	2	710	
D's 500	1320 : 500 :: 730 : 276	10	3	840	

Whole stock 1320

Proof L. 730

This account is proved by adding the gains of the partners; the sum of which will be equal to the whole gain, if the operation be right; but, if there be remainders, they must be added, their sum divided by the common divisor, and the quotient carried to the lowest place.

Ex. 2^d.] A bankrupt owes A L. 146, B L. 170, C L. 45, D L. 480, and E L. 72; his whole effects are only L. 342 : 7 : 6. How much should each have?

A's debt L. 146	913 : 146 :: L. 342 7 6 : L. 54 15	A's share.
B's 170	913 : 170 :: 342 7 6 : 63 15	B's
C's 45	913 : 45 :: 342 7 6 : 16 17	C's
D's 480	913 : 480 :: 342 7 6 : 180	D's
E's 72	913 : 72 :: 342 7 6 : 27	E's

913

1, 342 7 6

This might also be calculated, by finding what composition the bankrupt was able to pay per pound; which is obtained by dividing the amount of his effects by the amount of his debts; and comes to 7s. 6d. and then finding by the rules of practice, how much each debt came to at that rate.

CHAP. VII. RULES FOR PRACTICE.

16

THE operations explained in the foregoing chapters comprehend the whole system of arithmetic, and are sufficient for every computation. In many cases, however, the work may be contracted, by adverting to the particular circumstances of the question. We shall explain, in this chapter, the most useful methods which practice has suggested for rendering mercantile computations easy; in which, the four elementary rules of arithmetic are sometimes jointly, sometimes separately employed.

Sect. i. COMPUTATION OF PRICES.

The value of any number of articles, at a pound, a shilling,

17

Practice.

Practice.

shilling, or a penny, is an equal number of pounds, shillings, or pence; and these two last are easily reduced to pounds. The value, at any other rate, may be calculated by easy methods, depending on some contraction already explained, or on one or more of the following principles.

1st. If the rate be an aliquot part of a pound, a shilling, or a penny, then an exact number of articles may be bought for a pound, a shilling, or a penny; and the value is found by dividing the given number accordingly. Thus, to find the price of 10 many yards at 2s. 6d. which is the eighth part of a pound, we divide the quantity by eight, because every eight yards cost L. 1.

2^d. If the rate be equal to the sum of two other rates which are easily calculated, the value may be found by computing these separately, and adding the sums obtained. Thus, the price of 10 many yards, at 9d. is found, by adding their prices, at 6d. and 3d. together.

3^d. If the rate be equal to the difference of two easy rates, they may be calculated separately, and the lesser subtracted from the greater. Thus, the value of 10 many articles at 11d. is found, by subtracting their value at a penny from their value at a shilling. We may suppose that a shilling was paid for each article, and then a penny returned on each.

4th. If the rate be a composite number, the value may be found by calculating what it comes to at one of the component parts, and multiplying the same by the other.

CASE I. "When the rate is an aliquot part of a pound, divide the quantity by the number which may be bought for a pound."

Table of the aliquot parts of L. 1.

10 shillings = $\frac{1}{2}$ of L. 1.	1 shilling 4d. = $\frac{1}{10}$ of L. 1.
6 s. 8 d. = $\frac{1}{3}$	1 s. 3 d. = $\frac{1}{20}$
5 s. = $\frac{1}{4}$	1 s. = $\frac{1}{20}$
4 s. = $\frac{1}{5}$	8 d. = $\frac{1}{15}$
3 s. 4d. = $\frac{1}{6}$	6 d. = $\frac{1}{10}$
2 s. 6 d. = $\frac{1}{8}$	4 d. = $\frac{1}{20}$
2 s. = $\frac{1}{10}$	3 d. = $\frac{1}{20}$
1 s. 8 d. = $\frac{1}{12}$	2 d. = $\frac{1}{25}$

Ex. 1st.] What is the value of 7463 yards, at 4 s? 2^d.] What is the value of 1773 yards at 3 d.

5)7463
L. 1492 12 s.

8)1773
L. 22 3 3

In the first example we divide by 5, because 4 s. is $\frac{1}{5}$ of a pound; the quotient 1492 shows how many pounds they amount to; besides which there remains three yards at 4 s. and these come to 12 s. In the second example, we divide by 80, as directed, and the quotient gives L. 22, and the remainder 13 yards, which at 3 d. comes to 3 s. and 3 d.

This method can only be used in calculating for the particular prices specified in the table. The following 6 cases comprehend all possible rates, and will therefore exhibit different methods of solving the foregoing questions.

CASE II. "When the rate consists of shillings only, multiply the quantity by the number of shillings, and divide the product by 20: Or, if the number of shillings be even, multiply by half the number, and divide the product by 10.

Ex. 1st.] 4573 at 13 s.

13
13719
4573

20)59449

L. 2972 9 s.

The learner will easily perceive, that the method in which the second example is wrought, must give the same answer as if the quantity had been multiplied by 14, and divided by 20; and, as the division by 10 doubles the last figure for shillings, and continues all the rest unchanged for pounds, we may obtain the answer at once, by doubling the right-hand figure of the product before we set it down.

If the rate be the sum of two or more aliquot parts of a pound, we may calculate these as directed in Case I. and add them. If it be any odd number of shillings, we may calculate for the even number next lower, and add thereto the value at a shilling. If it be 19 s. we may subtract the value at a shilling, from the value at pound.

CASE III. "When the rate consists of pence only."

Method 1. If the rate be an aliquot part of a shilling, divide the quantity accordingly, which gives the answer in shillings; if not, it may be divided into two or more aliquot parts: calculate these separately, and add the values; reduce the answer to pounds.

1 penny is $\frac{1}{12}$ of a shilling.

2 d. = $\frac{1}{6}$ of ditto.

3 d. = $\frac{1}{4}$ of ditto.

4 d. = $\frac{1}{3}$ of ditto.

6 d. = $\frac{1}{2}$ of ditto.

5 d. is the sum of 4 d. and 1 d. or of 2 d. and 3 d.

7 d. is the sum of 4 d. and 3 d. or of 6 d. and 1 d.

8 d. is the sum of 6 d. and 2 d. or the double of 4d.

9 d. is the sum of 6 d. and 3 d.

10 d. is the sum of 6 d. and 4 d.

11 d. is the sum of 6 d. 3 d. and 2 d.

Ex. 1st.] 7423 at 4 d.

3)7423
20)2474 4
L. 123 14 4

2^d.] 9786 at 9 d.

At 6d. = $\frac{1}{2}$ of 1 s. 4893

At 3d. = $\frac{1}{4}$ of 6 d. 2446 6

At 9 d.

7339 6

L. 366 19 6

3^d.] 4856 at 11 d.

At 6d. = $\frac{1}{2}$ of 1 s. 2428

At 3d. = $\frac{1}{4}$ of 6 d. 1214

At 2d. = $\frac{1}{6}$ of 6 d. 809 4

11d.

4451 4

L. 222 11 4

It is sometimes easier to calculate at two rates, whose difference is the rate required, and subtract the lesser value from the greater. Thus, the last example may be wrought by subtracting the value at a penny from the value at a shilling. The remainder must be the value

lue

Practice.

Practice.

lue at 11d.

At 1s. 4856 s.

At 1d. = $\frac{1}{12}$ 404 8

At 11d.

4451 4

L. 222 11 4

Meth. 2. Multiply the quantity by the number of pence, the product is the answer in pence. Reduce it to pounds.

Method 3. Find the value at a penny by division, and multiply the same by the number of pence.

CASE IV. "When the rate consists of farthings only, find the value in pence, and reduce it by division to pounds."

Ex. 1st. 37843 at 1 farthing.2^d. 23754 at $\frac{1}{2}$ d.

4)37843 farth.

2)23754 halfpence

12)9460 $\frac{1}{2}$ pence

12)11877 pence

788 4 $\frac{1}{2}$

989 9

L. 39 8 4 $\frac{1}{2}$

L. 49 9 9

3^d. 72564 at $\frac{1}{4}$ d.

Or, 72564

3

At $\frac{1}{4}$ d. 3682 d.

4)217692 farth.

At $\frac{1}{2}$ d. 18141 d.

1)54423 pence

12)54423 d.

4535 3

4535 3

L. 226 15 3

L. 220 15 3

We may also find the amount in twopences, threepences, fourpences, or sixpences, by one division, and reduce these as directed in Case I.

CASE V. "When the rate consists of pence and farthings, find the value of the pence, as directed in Case III. and that of the farthings from the portion which they bear to the pounds. Add these together, and reduce."

Ex. 1st.] 3287 at 5 $\frac{1}{4}$ d.At 4d. = $\frac{1}{3}$ of 1s. 1095 8At 1d. = $\frac{1}{4}$ of 4d. 273 11At 1f. = $\frac{1}{4}$ of 1d. 68 5 $\frac{1}{2}$ At 5 $\frac{1}{4}$ d. 1438 $\frac{1}{2}$ L. 71 18 $\frac{1}{2}$ 2^d.] 4573 at 2 $\frac{1}{2}$ d.At 2d. = $\frac{1}{2}$ of 1s. 762 2At $\frac{1}{2}$ d. = $\frac{1}{4}$ of 2d. 190 6 $\frac{1}{2}$ At $\frac{1}{4}$ d. = $\frac{1}{8}$ of $\frac{1}{2}$ d. 85 3 $\frac{1}{2}$ At 2 $\frac{1}{2}$ d. 1037 11 $\frac{1}{2}$ L. 51 17 11 $\frac{1}{2}$ 3^d.] 2842 at 3 $\frac{1}{2}$ d.At 3d. = $\frac{3}{4}$ of 1s. 710 6At 3f. = $\frac{1}{4}$ of 3d. 177 7 $\frac{1}{2}$ At 3 $\frac{1}{2}$ d. 887 1 $\frac{1}{2}$ L. 44 8 1 $\frac{1}{2}$ 4th.] 3572 at 7 $\frac{1}{2}$ d.At 6d. = $\frac{1}{2}$ of 1s. 1386At 1 $\frac{1}{2}$ d. = $\frac{1}{4}$ of 6d. 346 6At 7 $\frac{1}{2}$ d. 1732 6

L. 87 12 6

It is sometimes best to join some of the pence with the farthings in the calculation. Thus, in Ex. 4. we reckon

the value at 6d. and at 3 halfpence which makes 7 $\frac{1}{2}$ d. Practice.

If the rate be 1 $\frac{1}{2}$ d. which is an eighth part of a shilling, the value is found in shillings, by dividing the quantity by 8.

CASE VI. "When the rate consists of shillings and lower denominations."

Method 1. Multiply the quantity by the shillings, and find the value of the pence and farthings, if any, from the proportion which they bear to the shillings. Add and reduce.

Ex. 1st.] 4258 at 17s. 3d.

17

29806

4258

17s.

72386

3d. = $\frac{1}{4}$ of 1s. 1064 6

17s. 3d.

L. 73450 6

3672 10 6

2^d.] 5482 at 12s. 4 $\frac{1}{2}$ d.

12

65784

12s.

3d. = $\frac{1}{4}$ of 1s. 1370 61 $\frac{1}{2}$ d. = $\frac{1}{8}$ of 3d. 685 312s. 4 $\frac{1}{2}$ d.

67839 9

L. 3391 19 9

Method 2. Divide the rate into aliquot parts of a pound; calculate the values corresponding to these, as directed in Case I. and add them.

Ex. 1st.] 3894 at 17 62^d.] 1765 at 9 210s. = $\frac{1}{2}$ L. 19476s. 8d. = $\frac{1}{3}$ L. 588 6 85 = $\frac{1}{4}$ 973 102 6 = $\frac{1}{8}$ 220 12 62 6d. = $\frac{1}{8}$ 486 15

9s. 2d. 808 19 2

17s. 6d. L. 3407 5

Sometimes part of the value is more readily obtained from a part already found; and sometimes it is easiest to calculate at a higher rate, and subtract the value at the difference.

3^d.] 63790 at 5 44th.] 3664 at 14 94s. = $\frac{1}{5}$ L. 1275810s. = $\frac{1}{2}$ L. 18321s. 4d. = $\frac{1}{7}$ of 4s. 4252 13 45s. = $\frac{1}{2}$ of 10s. 916

5s. 4d. L. 17010 13 4

15s. 2748

3d. = $\frac{1}{40}$ of 5s. 45 16

14s. 9d. L. 2702 4

Method 3. If the price contain a composite number of pence, we may multiply the value at a penny by the component parts.

Ex. 5628 at 2s. 11 d. or 35d.

2s. 11d.

12)5628

20)469

L. 23 9

5

L. 117 5

7

L. 820 15

Practice.

Practice.

CASE VII. "When the rate consists of pounds and lower denominations,"

Method 1. Multiply by the pounds, and find the value of the other denominations from the proportion which they bear to the pounds.

$$\text{Ex. 1}^{\text{st}}.] \quad 3592 \text{ at } L. 3 : 12 : 8.$$

$$\begin{array}{r} L. 3 \quad \quad \quad 10776 \\ 12s = \frac{1}{10} \text{ of } L. 3 \quad 2155 \quad 4 \\ 8d = \frac{1}{16} \text{ of } 12s. \quad 119 \quad 14 \quad 8 \\ \hline L. 3 \quad 12 \quad 8 \quad \quad L. 13050 \quad 18 \quad 8 \\ 2^{\text{d}}.] \quad 543 \text{ at } L. 2 : 5 : 10\frac{1}{2}. \\ \quad \quad \quad 2 \end{array}$$

$$\begin{array}{r} L. 2 \quad \quad \quad 1086 \\ 5s = \frac{1}{4} \text{ of } L. 1. \quad 135 \quad 15 \\ 10d = \frac{1}{8} \text{ of } 5s. \quad 22 \quad 12 \quad 6 \\ \frac{1}{2}d = \frac{1}{16} \text{ of } 10d. \quad 1 \quad 2 \quad 7\frac{1}{2} \\ \hline L. 1245 \quad 10 \quad 1\frac{1}{2} \end{array}$$

Method 2. Reduce the pounds to shillings, and proceed as in Case VI.

$$\begin{array}{r} \text{Ex. 1}^{\text{st}}.] \quad 3592 \text{ at } L. 3 : 12 : 8 \quad 2^{\text{d}}.] \quad 3683 \text{ at } L. 2 : 4 : 11 \\ \quad \quad \quad 72 \quad 20 \quad \quad \quad 45 \\ \quad \quad \quad \hline \quad \quad \quad 7184 \quad 72 \quad \quad \quad 18415 \\ \quad \quad \quad 25144 \quad \quad \quad 14732 \\ \hline 258624 \quad \text{At } 45s. \quad 165735 \\ 4d. = \frac{1}{4} s. \quad 1197 \quad 4 \quad \text{At } 1d. = \frac{1}{24} s. \quad 307 \quad 11 \\ 4d. = \frac{1}{4} s. \quad 1197 \quad 4 \quad \quad \quad 44s. 11d. \quad 165427 \quad 1 \\ \hline 8d. \quad 261018 \quad 8 \quad \quad \quad L. 8271 \quad 7 \quad 1 \\ \quad \quad \quad L. 13050 \quad 18 \quad 8 \end{array}$$

The learner should at first try every calculation more ways than one; which will not only serve the purpose of proving the operation, but will render him expert at discovering the best method for solving each question, and will lead him to invent other methods; for we have not exhausted the subject.

Thus, if the number of articles be 20, each shilling of the rate makes a pound of the amount. If it be 12, each penny of the rate makes a shilling of the amount. If 240, each penny of the rate makes a pound of the amount. If 480, each half-penny makes a pound. If 960, each farthing makes a pound. If the number of articles be a multiple, or an aliquot part of any of these, the amount is easily calculated. And if it be near to any such number, we may calculate for that number, and add or subtract for the difference.

We have hitherto explained the various methods of computation, when the quantity is a whole number, and in one denomination. It remains to give the proper directions when the quantity contains a fraction, or is expressed in several denominations.

When the quantity contains a fraction, work for the integers by the preceding rules, and for the fraction take proportional parts.

When the quantity is expressed in several denominations and the rate given for the higher; calculate the higher, consider the lower ones as fractions, and work by the last rule.

When the rate is given for the lower denomination, reduce the higher denomination to the lower, and calculate accordingly.

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Note 1st. 7 lb. 14 lb. and 21 lb. are aliquot parts of 1 qr. : and 16 lb. is $\frac{1}{2}$ of 1 cwt.; and are therefore easily calculated.

2^d. If the price of a dozen be so many shillings, that of an article is as many pence; and if the price of a grob is so many shillings, that of a dozen is as many pence.

3^d. If the price of a ton or score be so many pounds, that of 1 cwt. or a single article, is as many shillings.

4th. Though a fraction less than a farthing is of no consequence, and may be rejected, the learner must be careful lest he lose more than a farthing, by rejecting several remainders in the same calculation.

SECT. II. DEDUCTIONS ON WEIGHTS, &c.

18

THE full weight of any merchandise, together with that of the cask, box, or other package, in which it is contained, is called the *gross weight*. From this we must make proper deductions, in order to discover the quantity, for which price or duty should be charged, which is called the *nett weight*.

Tare is the allowance for the weight of the package; and this should be ascertained by weighing it before the goods are packed. Sometimes, however, particularly in payment of duty, it is customary to allow so much per C. or so much per 100 lb. in place of tare.

Tret is an allowance of 4 lb. on 104 granted on currents, and other goods on which there is waste, in order that the weight may answer when the goods are retailed.

Cloff, or Draught, is a further allowance granted on some goods in London, of 2 lb. on every 3 C. to turn the scale in favour of the purchaser. The method of calculating these and the like will appear from the following examples.

Ex. 1st. What is the nett weight of 17 C. 2 q. 14 lb. tare 18 lb. per cwt.

$$\begin{array}{r} C. \quad q. \quad lb. \quad \quad \quad C. \quad q. \quad lb. \\ 17 \quad 2 \quad 14 \text{ gross.} \quad \text{or, } 17 \quad 2 \quad 14 \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad 6 \\ 16 \text{ lb.} = \frac{1}{4} C. \quad 2 \quad 2 \quad 2 \\ 2 \text{ lb.} = \frac{1}{8} \text{ of } 16 \text{ lb.} \quad 1 \quad 7 \quad \quad \quad 105 \quad 3 \quad - \\ \hline 18 \text{ lb.} \quad \quad \quad 2 \quad 3 \quad 9\frac{1}{2} \text{ tare.} \quad \quad \quad 3 \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad 317 \quad 1 \\ \quad \quad \quad 14 \quad 3 \quad 4\frac{1}{2} \text{ nett. } 28) 317\frac{1}{2} \text{ lb. } C. \quad q. \quad lb. \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad 4) 11 \quad 9\frac{1}{2} (2 \quad 3 \quad 9\frac{1}{2} \text{ tare} \end{array}$$

In the first method, we add the tare at 16 lb. which is $\frac{1}{4}$ of the gross weight to the tare, at 2 lb. which is $\frac{1}{8}$ of the former. In the second, we multiply the gross weight by 18; the tare is 1 lb. for each cwt. of the product, and is reduced by division to higher denominations.

2^d.] What is Tret of 158 C. 2 q. 24 lb.?

C. q. lb. C. q. lb.
26) 158 2 26 (6 — 11 Tret.

$$\begin{array}{r} 156 \\ \hline 2 \\ 4 \\ - \\ 10 \\ 28 \\ \hline 286 \\ 280 \\ \hline 6 \end{array}$$

Because tret is always 4 lb. in 104, or 1 lb. in 26, it is obtained by dividing by 26.

Practice.

3^d.] What is the cloff on 28 C. 2 q.?

C. q.
28 2
2

3) 57 (19 lb.

This allowance being 2 lb. on every 3 C. might be found by taking $\frac{1}{3}$ of the number of Cs and multiplying it by 2. It is better to begin with multiplication, for the reason given p. 663. col. 2 par. 1.

SECT. III. COMMISSION, &c.

It is frequently required to calculate allowances on sums of money, at the rate of so many per L. 100. Of this kind is COMMISSION, or the allowance due to a factor for buying or selling goods, or transacting any other business; PREMIUM of INSURANCE, or allowance given for engaging to repay one's losses at sea, or otherwise; EXCHANGE, or the allowance necessary to be added or subtracted for reducing the money of one place to that of another; PREMIUMS on STOCKS, or the allowance given for any share of a public stock above the original value. All these and others of a like kind are calculated by the following

RULE. "Multiply the sum by the rate, and divide the product by 100. If the rate contain a fraction, take proportional parts.

Ex. What is the commission on L. 728, at $2\frac{1}{2}$ per cent.

	728
	2
2 per cent.	1456
$\frac{1}{4}$	364
$\frac{1}{4}$	182
100	2002
	20
	40
	12
	480
	4 Anf. L. 20—4 $\frac{1}{2}$

320

When the rate is given in guineas, which is common in cases of insurance, you may add a twentieth part to the sum before you calculate. Or you may calculate at an equal number of pounds, and add a twentieth part to the answer.

When the given sum is an exact number of 10 pounds, the calculation may be done without setting down any figures. Every L. 10, at $\frac{1}{2}$ per cent. is a shilling; and at other rates in proportion. Thus, L. 170, at $\frac{1}{2}$ per cent. is 17 s.; and, at $\frac{1}{4}$ per cent. 8 s. 6 d.

SECT. IV. INTEREST.

Interest is the allowance given for the use of money by the borrower to the lender. This is computed at so many pounds for each hundred lent for a year, and a like proportion for a greater or a less time. The highest rate is limited by our laws to 5 per cent. which is called the *legal interest*; and is due on all debts constituted by bond or bill, which are not paid at the proper term, and is always understood when no other rate is mentioned.

The interest of any sum for a year, at any rate, is found by the method explained in the last section.

The interest of any number of pounds for a year, at 5 per cent. is one twentieth part, or an equal number of shillings. Thus, the interest of L. 34675 for a year is 34675 shillings.

The interest for a day is obtained by dividing the interest for a year, by the number of days in a year. Thus, the interest of L. 34675 for a day is found by dividing 34675 shillings by 365, and comes to 95 shillings.

The interest for any number of days is obtained by multiplying the daily interest by the number of days. Thus, the interest of L. 34675 for 17 days, is 17 times 95 shillings, or 1615 shillings; and this divided by 20, in order to reduce it, comes to L. 80 : 15 s.

It would have served the same purpose, and been easier to multiply at first by 17, the number of days; and, instead of dividing separately by 365, and by 20, to divide at once by 7300, the product of 365 multiplied by 20; and this division may be facilitated by the table inserted p. 661. col. 1.

The following practical rules may be inferred from the foregoing observations.

I. *To calculate interest at 5 per cent.* "Multiply the principal by the number of days, and divide the product by 7300."

II. *To calculate interest at any other rate.* "Find what it comes to at 5 per cent. and take a proper proportion of the same for the rate required."

Ex. 1st. Interest on L. 34675 for 17 days, at 5 per cent.

	34675
	17
	242725
	34675
	L. s.
73100	589475(80 15-
	584
	5475
	20
	1095100
	73
	365
	365

Ex. 2^d. Interest on 304 : 3 : 4 for 8 days, at 4 per cent.

	L. 304	3	4
		8	
			s. d.
73100	2433	6	8(6 8
		20	
	48666		
	438		
	4866		
	12		
	584100		
	584		

Int.

Deduce $\frac{x}{y}$ — 1 4

Practice.

Days.

Here we subtract the several payments from the original sum in their order, placing the dates in the margin; and from this it appears that there is interest due on L. 170 from 12th August to 18th September, or L. 110 from 18th September to 17th October, and on L. 60 from 17th October to 14th November. We next compute the number of days in each of these periods, and mark it against the respective sum. Then we multiply each sum by the number of days; reserving a column, when necessary, for the products of the several figures in the multiplier. Lastly, we add these products, and divide the sum by 7300.

Interest on current accounts is calculated nearly in the same manner. For example, let the interest due on the following account be required to 31st July, at 4 per cent?

Dr. Mr A. Baird, his account current with W. Neil, Cr.

1775.					1775.			
Jan. 15.	To cash	L. 160			Mar. 22.	By cash	L. 50	
Mar. 12.	To ditto	36			May 16.	By ditto	37	
June 23.	To ditto	13	4	6	June 15.	By ditto	25	12 6
July 19.	To ditto	26	13	4	28.	By ditto	32	5 4

1775.	L.	s.d.	Days		
Jan. 15.	D ^r .	160	50	960	
Mar. 11.	D ^r .	36	800		
	D ^r .	196	10	8960	Jan. 16
22.	D ^r .	50		1960	Feb. 28
	D ^r .	146	53	73	Mar. 31
May 16.	D ^r .	37	730		Apr. 30
	D ^r .	109		8030	May 31
June 15.	D ^r .	25 12 6	30	3170	June 30
	D ^r .	83 7 6	8		July 31
23.	D ^r .	13 4 6		667	—
	D ^r .	96 12	3		Days 197
28.	D ^r .	31 5 4		483	
	D ^r .	64 6 8	21	64	
July 19.	D ^r .	20 13 4		1187	
31.		91	12	1351	
				1094	
			197 7300	14813/L. 3 20	81. 31

Deduce $\frac{1}{2}$ part 14 $\frac{1}{2}$

Interest at 4 per cent. L. 2 16 7

Here the fums on either fide of the account are introduced according to the order of the dates. Thofe on the D^r fide are added to the former balance, and thofe on the C^r fide fubtracted. Before we calculate the days, we try if the laft fum L. 91, be equal to the balance of the account, which proves the additions and fubtractions; and, before multiplying, we try if the fum of the column of days be equal to the number of days, from 1th January to 31st of July.

In the 5th and 6th multiplications, we begin at the pence-column, and take in the carriage. In the 7th instead of multiplying the 6s. 8 d. by 21, we add the third part 21 to the product, because 6s. 8 d. is the third of a pound. This is done by marking down the second line 1287, instead of 1280. As the computation on the odd shillings and pence is troublesome, and makes a very small increase of the interest, some neglect them altogether; others add one to the pound, when the shillings exceed 10, and neglect them when below it.

2^d.] Required interest on the following account to 31st December, allowing 5 per cent, when the balance is due to J. T. and 4 per cent. when due to N. W.

Dr Mr J. T. his account current with N. W. Cr.

Dec. 31.	To balance	L. 150	April 9.	By cash	L. 70
Mar. 12.	To cash	120	May 12.	By cash	300
June 17.	To cash	165	June 3.	By cash	240
Sept. 24.	To cash	242	Aug. 2.	By cash	10
Oct. 9.	To cash	178			
1775.			Days		
Dec. 31.	D ^r .	L 150	71	150	
1776.				1050	
Mar. 12.	D ^r .	120			10650
				2160	
	D ^r .	270	28	540	
April 9.	C ^r .	70			7560
	D ^r .	200	33		6600
May 12.	C ^r .	300			
	C ^r .	100	22		2200
June 3.	C ^r .	240			
	C ^r .	340	14	1360	4760
17.	D ^r .	165		340	
	C ^r .	175	46	1050	8050
Aug. 2.	C ^r .	10		700	
	C ^r .	185	53	555	9805
Sept. 24.	D ^r .	242		925	
	D ^r .	57	15	285	
Oct. 9.	D ^r .	178		57	855
Dec. 31.	D ^r .	235	83	705	
				1880	
			365		19505

Interest due to N. W. at 5 per cent.	£.	6	8	9
Deduct $\frac{1}{2}$			1	5

Due to N. W. at 4 per cent.	L. 5	3	4
Due to J. T. at 5 per cent.	3	7	11 $\frac{1}{2}$

Balance due to N. W. L. 1 15 4 $\frac{1}{4}$
4 P 2 18

In this account, the balance is sometimes due to the one party, sometimes to the other. At the beginning, there is a balance due to N. W.; and, on the 9th of April, there is L. 200 due him. On the 12th of May, J. T. pays him L. 300, which discharges what he owed, and leaves a balance of L. 100 due him. The balance continues in J. T.'s favour till the 24th of September, when N. W. pays L. 242. These changes are distinguished by the marks D^r. and Cr. The products are extended in different columns, and divided separately.

When payments are made on confuted debts, at considerable distances of time, it is usual to calculate the interest to the date of each payment, and add it to the principal, and then subtract the payment from the amount.

Ex. A bond for L. 540 was due the 18th Aug. 1772; and there was paid 10th March 1773 L. 50; and 19th December 1773 L. 25; and 23^d September 1774 L. 25; and 18th August 1775 L. 110. Required the interest and balance due on the 11th November 1775?

A bond due 13 th August 1772	L. 540	2 6	16 2 6
Interest to 19 th March 1773, 218 days	L. 566	2 6	
Paid 19 th March 1773	50		
Balance due 19 th March 1773	L. 506	2 6	
Interest to 19 th December 1773, 275 days	19	1 2	
Paid 19 th December 1773	L. 525	3 8	
Balance due 19 th December 1773	L. 500	3 8	
Interest to 23 ^d September 1774, 278 days	9	19 9	
Paid 23 ^d September 1774	L. 519	4 5	
Balance due 23 ^d September 1774	L. 494	4 5	
Interest to 18 th August 1775, 319 days	22	5 3	
Paid 18 th August 1775	L. 516	9 8	
Balance due 18 th August 1775	L. 406	9 8	
Interest to 11 th November 1775, 85 days	4	14 6	
Balance due 11 th November 1775	L. 411	4 2	
Amount of the interest L. 81	4 2		

CHAP. VIII. VULGAR FRACTIONS.

IN order to understand the nature of vulgar fractions, we must suppose unity (or the number 1) divided into several equal parts. One or more of these parts is called a *fraction*, and is represented by placing one number in a small character above a line, and another under it: For example, two fifth parts is written thus, $\frac{2}{5}$. The number under the line (5) shows how many parts unity is divided into, and is called the *denominator*. The number above the line (2) shows how many of these parts are represented, and is called the *numerator*.

It follows from the manner of representing fractions, that, when the numerator is increased, the value of the fraction becomes greater; but, when the denominator is increased, the value becomes less. Hence we may infer, that, if the numerator and denominator be both increased, or both diminished, in the same proportion, the value is not altered; and therefore, if we multiply

both by any number whatever, or divide them by any number which measures both, we shall obtain other fractions of equal value. Thus, every fraction may be expressed in a variety of forms, which have all the same signification.

A fraction annexed to an integer, or whole number, makes a mixed number. For example, five and two third-parts, or $5\frac{2}{3}$. A fraction whose numerator is greater than its denominator is called an *improper fraction*. For example, seventeen third-parts, or $5\frac{2}{3}$. Fractions of this kind are greater than unity. Mixed numbers may be represented in the form of improper fractions, and improper fractions may be reduced to mixed numbers, and sometimes to integers. As fractions, whether proper or improper, may be represented in different forms, we must explain the method of reducing them from one form to another, before we consider the other operations.

PROBLEM I. "To reduce mixed numbers to improper fractions; Multiply the integer by the denominator of the fraction, and to the product add the numerator. The sum is the numerator of the improper fraction sought, and is placed above the given denominator."

$$\text{Ex. } 5\frac{2}{3} = \frac{17}{3}$$

5 integer.
3 denominator.

15 product.
2 numerator given.

17 numerator sought.

Because one is equal to two halves, or 3 third parts, or 4 quarters, and every integer is equal to twice as many halves, or four times as many quarters, and so on; therefore, every integer may be expressed in the form of an improper fraction, having any assigned denominator: The numerator is obtained by multiplying the integer into the denominator. Hence the reason of the foregoing rule is evident. 5, reduced to an improper fraction, whose denominator is 3, makes $\frac{15}{3}$, and this added to $\frac{2}{3}$, amounts to $\frac{17}{3}$.

PROBLEM II. "To reduce improper fractions to whole or mixed numbers: Divide the numerator by the denominator."

$$\text{Ex. } \frac{17}{3} = 5\frac{2}{3}$$

$$\begin{array}{r} 17 \overline{) 112} (6 \frac{2}{3} \\ \underline{102} \\ 10 \end{array}$$

$$\begin{array}{r} 1. \frac{3248}{1000} \\ 2. \frac{142}{100} \\ 3. \frac{7116}{1000} \\ 4. \frac{11264}{1000} \end{array}$$

$$\begin{array}{r} 5. \frac{165}{100} \\ 6. \frac{7124}{100} \\ 7. \frac{8642}{100} \\ 8. \frac{972}{100} \end{array}$$

This problem is the converse of the former, and the reason may be illustrated in the same manner.

PROBLEM III. "To reduce fractions to lower terms. Divide both numerator and denominator by any number which measures both, and place the quotients in the form of a fraction."

$$\text{Example. } \frac{135}{360} = \frac{3}{8} = \frac{1}{3}$$

Here we observe that 135 and 360 are both measured by 5, and the quotients form $\frac{27}{72}$, which is a fraction of the same value as $\frac{135}{360}$ in lower terms. Again, 27 and 72 are both measured by 9, and the quotients form $\frac{3}{8}$, which is still of equal value, and in lower terms.

It is generally sufficient, in practice, to divide by such measures as are found to answer on inspection, or by the rules given p. 659. col. 2. But, if it be required to reduce a fraction to the lowest possible terms, we must di-

vide

vide the nominator and denominator by the greatest number which measures both. What number this is may not be obvious, but will always be found by the following rule.

To find the greatest common measure of two numbers, divide the greater by the lesser, and the divisor by the remainder continually, till nothing remain; the last divisor is the greatest common measure.

Example. Required the greatest number which measures 475 and 589?

$$\begin{array}{r} 475)589(1 \\ \underline{475} \\ 114)475(4 \\ \underline{456} \\ 19)114(6 \\ \underline{114} \\ 0 \end{array}$$

Here we divide 589 by 475, and the remainder is 114; then we divide 475 by 114, and the remainder is 19; then we divide 114 by 19, and there is no remainder: from which we infer, that 19, the last divisor, is the greatest common measure.

To explain the reason of this, we must observe, that any number which measures two others, will also measure their sum, and their difference, and will measure any multiple of either. In the foregoing example, any number which measures 589, and 475, will measure their difference 114, and will measure 456, which is a multiple of 114; and any number which measures 475, and 456, will also measure their difference 19. Consequently, no number greater than 19 can measure 589 and 475. Again, 19 will measure them both, for it measures 114, and therefore measures 456, which is a multiple of 114, and 475, which is just 19 more than 456; and, because it measures 475 and 114, it will measure their sum 589. To reduce $\frac{475}{589}$ to the lowest possible terms, we divide both by numbers 19, and it comes to $\frac{25}{31}$.

If there be no common measure greater than 1, the fraction is already in the lowest terms.

If the greatest common measure of 3 numbers be required, we find the greatest measure of the two first, and then the greatest measure of that number, and the third. If there be more numbers, we proceed in the same manner.

PROBLEM IV. "To reduce fractions to others of equal value that have the same denominator: 1st, "Multiply the numerator of each fraction by all the denominators except its own. The products are numerators to the respective fractions sought." 2^d, "Multiply all the denominators into each other; the product is the common denominator."

Ex. $\frac{2}{3}$ and $\frac{1}{4}$ and $\frac{1}{5}$ = $\frac{2 \times 4 \times 5}{3 \times 4 \times 5}$ and $\frac{1 \times 3 \times 5}{3 \times 4 \times 5}$ and $\frac{1 \times 3 \times 4}{3 \times 4 \times 5}$.

4 × 9 × 8 = 288 first numerator.

7 × 5 × 8 = 280 second numerator.

3 × 5 × 9 = 135 third numerator.

5 × 9 × 8 = 360 common denominator.

Here we multiply 4, the numerator of the first fraction, by 9 and 3 the denominators of the two others; and the product 288 is the numerator of the fraction sought, equivalent to the first. The other numerators are found in like manner, and the common denominator 360, is obtained by multiplying the given denominators 3, 9, 8, into each other. In the course of the whole operation, the numerators and denominators of each fraction are multiplied by the same number, and therefore their value is not altered.

The fractions thus obtained may be reduced to lower terms, if the several numerators and denominators have a common measure greater than unity. Or, after arranging the number for multiplication, as is done above, if the same number occur in each rank, we may dash them out and neglect them; and, if numbers which have a common measure occur in each, we may dash them out and use the quotients in their stead; or any number, which is a multiple of all the given denominators, may be used as a common denominator. Sometimes a number of this kind will occur on inspection, and the new numerators are found by multiplying the given ones by the common denominator, and dividing the products by the respective given denominators.

If the articles given for any operation be mixed numbers, they are reduced to improper fractions by problem I. If the answer obtained be an improper fraction, it is reduced to a mixed number by problem II. And, it is convenient to reduce fractions to lower terms, when it can be done, by problem III. which makes their value better apprehended, and facilitates any following operation. The reduction of fractions to the same denominator by problem IV. is necessary to prepare them for addition or subtraction, but not for multiplication or division.

1. ADDITION of VULGAR FRACTIONS.

22

RULE. "Reduce them, if necessary, to a common denominator; add the numerators, and place the sum above the denominator."

Ex. 1st.] $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$ by problem IV. = $\frac{17}{24}$
2^d.] $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{3}{6} + \frac{2}{6} + \frac{1}{6} = \frac{6}{6} = 1$ by problem II. = $3 \frac{17}{24}$

The numerators of fractions that have the same denominator signify like parts; and the reason for adding them is equally obvious, as that for adding shillings or any other inferior denomination.

Mixed numbers may be added, by annexing the sum of the fractions to the sum of the integers. If the former be a mixed number, its integer is added to the other integers.

2. SUBTRACTION of VULGAR FRACTIONS.

23

RULE. "Reduce the fractions to a common denominator; subtract the numerator of the subtrahend from the numerator of the minuend, and place the remainder above the denominator."

Ex. Subtract $\frac{1}{2}$ from $\frac{1}{3}$ remainder $\frac{1}{6}$
 $\frac{1}{3} = \frac{2}{6}$ } by Prob. IV. from 35
 $\frac{1}{2} = \frac{3}{6}$ } take 24
rem. 11

To subtract a fraction from an integer: subtract the numerator from the denominator, and place the remainder above the denominator; prefix to this the integer diminished by unity.

Ex. Subtract $\frac{1}{2}$ from 12 remainder $11 \frac{1}{2}$.

To subtract mixed numbers, proceed with the fractions by the foregoing rule, and with the integers in the common method. If the numerator of the fraction in the subtrahend exceed that in the minuend, borrow the value of the denominator, and repay it by adding 1 to the unit-place of the subtrahend.

Ex.

Ex. Subtract $145\frac{3}{4}$ from $248\frac{1}{2}$

$$\begin{array}{r} 248\frac{1}{2} \\ -145\frac{3}{4} \\ \hline 102\frac{1}{4} \end{array}$$

by Prob. IV.

Here, because 27 the numerator of the fraction in the minuend is less than 35, the numerator of the subtrahend, we borrow 45 the denominator; 27 and 45 make 72, from which we subtract 35, and obtain 37 for the numerator of the fraction in the remainder, and we repay what was borrowed, by adding 1 to 5 in the unit-place of the subtrahend.

The reason of the operations in adding or subtracting fractions will be fully understood, if we place the numerators of the fractions in a column like a lower denomination, and add or subtract them as integers, carrying or borrowing according to the value of the higher denomination.

24

3. MULTIPLICATION OF VULGAR FRACTIONS.

RULE. "Multiply the numerators of the factors together for the numerator of the product, and the denominators together for the denominator of the product."

$$\begin{array}{ll} \text{Ex. 1}^{\text{st}}. \frac{1}{2} \times \frac{5}{7} = \frac{5}{14} & 2^{\text{d}}. 8\frac{1}{2} \times 7\frac{1}{2} = 65\frac{1}{4} \\ 2 \times 5 = 10 \text{ num.} & 8\frac{1}{2} = \frac{17}{2} \text{ by prob. I.} \\ 3 \times 7 = 21 \text{ den.} & 7\frac{1}{2} = \frac{15}{2} \text{ by ditto} \\ & 42 \times 31 = 1302 \\ & 5 \times 4 = 20 \end{array}$$

To multiply $\frac{1}{2}$ by $\frac{5}{7}$ is the same, as to find what two thirds of $\frac{1}{2}$ comes to; if one third part only had been required, it would have been obtained by multiplying the denominator 7 by 3, because the value of fractions is lessened when their denominators are increased; and this comes to $\frac{1}{21}$; and, because two thirds were required, we must double that fraction, which is done by multiplying the numerator by 2, and comes to $\frac{2}{21}$. Hence we infer, that fractions of fractions, or compound fractions, such as $\frac{2}{3}$ of $\frac{1}{2}$ are reduced to simple ones by multiplication. The same method is followed when the compound fraction is expressed in three parts or more.

If a number be multiplied by any integer, its value is increased: if it be multiplied by 1, or taken one time, it undergoes no alteration. If it be multiplied by a proper fraction, or taken for one half, two thirds, or the like, its value is diminished, and the product is less than the number multiplied.

The foregoing rule extends to every case, when there are fractions in either factor. For mixed numbers may be reduced to improper fractions, as is done in Ex. 2^d; and integers may be written, or understood to be written, in the form of fractions whose numerator is 1. It will be convenient, however, to give some further directions for proceeding, when one of the factors is an integer, or when one or both are mixed numbers.

1st. To multiply an integer by a fraction, multiply it by the numerator, and divide the product by the denominator. Ex. $3756 \times \frac{1}{3} = 253\frac{2}{3}$

$$\begin{array}{r} 3 \\ \hline 511268(2253\frac{2}{3}) \end{array}$$

2^d. To multiply an integer by a mixed number, we multiply it first by the integer, and then by the fraction, and add the products.

Ex. $138 \times 5\frac{1}{2} = 793\frac{1}{2}$ $138 \times 5 = 690$ $138 \times \frac{1}{2} = 69$

3

4)414(103

793

3^d. To multiply a mixed number by a fraction, we may multiply the integer by the fraction, and the two fractions together, and add the products.

$$\begin{array}{l} \text{Ex. } 15\frac{1}{2} \times \frac{2}{3} = 3\frac{1}{3} \\ 15 \times \frac{2}{3} = 10 \\ \frac{1}{2} \times \frac{2}{3} = \frac{1}{3} \\ \hline 10\frac{1}{3} \end{array}$$

4th. When both factors are mixed numbers, we may multiply each part of the multiplicand first by the integer of the multiplier, and then by the fraction, and add the four products.

$$\begin{array}{l} \text{Ex. } 8\frac{1}{2} \text{ by } 7\frac{1}{2} \\ 8 \times 7 = 56 \\ 8 \times \frac{1}{2} = 4 \\ \frac{1}{2} \times 7 = 3\frac{1}{2} \\ \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \\ \hline 60\frac{3}{4} \end{array}$$

by prob. II.

product $65\frac{3}{4}$ as before.

4. DIVISION OF VULGAR FRACTIONS.

25

RULE I. "Multiply the numerator of the dividend by the denominator of the divisor. The product is the 'numerator of the quotient.'"

II. "Multiply the denominator of the dividend by the numerator of the divisor. The product is the 'denominator of the quotient.'"

$$\begin{array}{l} \text{Ex. Divide } \frac{2}{3} \text{ by } \frac{7}{9} \text{ Quotient } \frac{3}{7} \\ 2 \times 9 = 18 \\ 5 \times 7 = 35 \end{array}$$

To explain the reason of this operation, let us suppose it required to divide $\frac{2}{3}$ by $\frac{7}{9}$, or to take one seventh part of that fraction. This is obtained by multiplying the denominator by 7; for the value of fractions is diminished by increasing their denominators, and comes to $\frac{2}{21}$. Again, because $\frac{2}{3}$ is nine times less than $\frac{2}{21}$, the quotient of any number divided by $\frac{2}{3}$ will be nine times greater than the quotient of the same number divided by $\frac{2}{21}$. Therefore we multiply $\frac{2}{21}$ by 9, and obtain $\frac{2}{7}$.

If the divisor and dividend have the same denominator, it is sufficient to divide the numerators.

Ex. $\frac{2}{3}$ divided by $\frac{1}{3}$ quotes 4.

The quotient of any number divided by a proper fraction is greater than the dividend. It is obvious, that any integer contains more halves, more third parts, and the like, than it contains units; and, if an integer and fraction be divided alike, the quotients will have the same proportion to the numbers divided; but the value of an integer is increased when the divisor is a proper fraction; therefore, the value of a fraction in the like case is increased also.

The foregoing rule may be extended to every case, by reducing integers and mixed numbers to the form of improper fractions. We shall add some directions for shortening the operation when integers and mixed numbers are concerned.

1st. When the dividend is an integer, multiply it by

Vulgar Fractions. by the denominator of the divisor, and divide the product by the numerator.

Ex. Divide 368 by $\frac{1}{4}$

$$\begin{array}{r} 7 \\ 5) 2576 \quad (515\frac{1}{5} \text{ quotient.} \end{array}$$

2^d. When the divisor is an integer, and the dividend a fraction, multiply the denominator by the divisor, and place the product under the numerator,

Ex. Divide $\frac{1}{2}$ by 5 quotient $\frac{1}{10}$
 $8 \times 5 = 40$

3^d. When the divisor is an integer, and the dividend a mixed number, divide the integer, and annex the fraction to the remainder; then reduce the mixed number, thus formed, to an improper fraction, and multiply its denominator by the divisor.

Ex. To divide $576\frac{1}{2}$ by 7 quotient $82\frac{3}{7}$

$$\begin{array}{r} 7) 576 \quad (82 \\ 56 \\ \hline 16 \\ 14 \\ \hline 2\frac{4}{7} = 2\frac{4}{7} \\ 11 \times 7 = 77 \end{array}$$

Here we divide 576 by 7, the quotient is 82, and the remainder 2, to which we annex the fraction $\frac{1}{2}$; and reduce $2\frac{1}{2}$ to an improper fraction $\frac{5}{2}$, and multiply its denominator by 7, which gives $\frac{35}{2}$.

Hitherto we have considered the fractions as abstract numbers, and laid down the necessary rules accordingly. We now proceed to apply these to practice. Shillings and pence may be considered as fractions of pounds, and lower denominations of any kind as fractions of higher; and any operation, where different denominations occur, may be wrought by expressing the lower ones in the form of vulgar fractions, and proceeding by the foregoing rules. For this purpose, the two following problems are necessary.

PROBLEM V. "To reduce lower denominations to fractions of higher, place the given number for the numerator, and the value of the higher for the denominator."

Examples.

1. Reduce 7 d. to the fraction of a shilling. Anf. $\frac{7}{12}$
2. Reduce 7 d. to a fraction of a pound. Anf. $\frac{7}{240}$
3. Reduce 15 s. 7 d. to a fraction of a pound. Anf. $\frac{157}{240}$

PROBLEM VI. "To value fractions of higher denominations, multiply the numerator by the value of the given denomination, and divide the product by the denominator; if there be a remainder, multiply it by the value of the next denomination, and continue the division."

Ex. 1st.] Required the value 2^d.] Required the value of $\frac{1}{16}$ of £. 1. of $\frac{1}{8}$ of 1 Cwt.

$\begin{array}{r} 17 \\ 20 \\ \hline 60) 340 \\ 300 \\ \hline 40 \\ 12 \\ \hline 60) 480 \\ 480 \\ \hline 0 \end{array}$	s. d.	$\begin{array}{r} 8 \\ 3 \\ \hline 9) 32 \\ 27 \\ \hline 5 \\ 28 \\ \hline 9) 140 \\ 9 \\ \hline 50 \\ 45 \\ \hline 5 \end{array}$	qrs. lb.
--	-------	--	----------

In the first example, we multiply the numerator 17 by 20, the number of shillings in a pound, and divide the product 340 by 60, the denominator of the fraction, and obtain a quotient of 5 shillings; then we multiply the remainder 40 by 12, the number of pence in a shilling, which produces 480, which divided by 60 quotes 8 d. without a remainder. In the second example we proceed in the same manner; but as there is a remainder, the quotient is completed by a fraction.

Sometimes the value of the fraction does not amount to a unit of the lowest denomination; but it may be reduced to a fraction of that or any other denomination, by multiplying the numerator according to the value of the places. Thus $\frac{1}{12}$ of a pound is equal to $\frac{1}{12} \times \frac{20}{20}$ of a shilling, or $\frac{1}{6}$ of a penny, $\frac{1}{6} \times \frac{4}{4}$ of a farthing.

CHAP. IX. DECIMAL FRACTIONS.

SECT. I. NOTATION AND REDUCTION.

26

THE arithmetic of vulgar fractions is tedious, and even intricate to beginners. The difficulty arises chiefly from the variety of denominators; for when numbers are divided into different kinds of parts, they cannot be easily compared. This consideration gave rise to the invention of decimal fractions, where the units are divided into like parts, and the divisions and subdivisions are regulated by the same scale which is used in the Arithmetic of Integers. The first figure of a decimal fraction signifies tenth parts, the next hundredth parts, the next thousandth parts, and so on; and the columns may be titled accordingly. Decimals are distinguished by a point, which separates them from integers, if any be prefixed.

The use of cyphers in decimals, as well as in integers, is to bring the significant figures to their proper places, on which their value depends. As cyphers, when placed on the left hand of an integer, have no signification, but when placed on the right hand, increase the value ten times each; so cyphers, when placed on the right hand of a decimal, have no signification; but when placed on the left hand, diminish the value ten times each.

The notation and numeration of decimals will be obvious from the following examples:

- | | |
|-------|---|
| 4.7 | signifies Four, and seven tenth-parts. |
| .47 | Four tenth-parts, and seven hundredth-parts, or 47 hundredth-parts. |
| .047 | Four hundredth-parts, and seven thousandth-parts, or 47 thousandth-parts. |
| .407 | Four tenth-parts, and seven thousandth-parts, or 407 thousandth-parts. |
| 4.07 | Four, and seven hundredth-parts. |
| 4.007 | Four, and seven thousandth-parts. |

The column next the decimal point is sometimes called *decimal primes*, the next *decimal seconds*; and so on.

To reduce vulgar fractions to decimal ones: "Annex a cypher to the numerator, and divide it by the denominator, annexing a cypher continually to the remainder."

Ex.

Decimal Fractions.	Ex. 1 st . $\frac{1}{7} = .16$	2 ^d . $\frac{1}{8} = .078125$	3 ^d . $\frac{1}{3} = .666$	as Ex. 3 ^d . and 5 th .	Decimal Fractions.
	$\frac{1}{75} 120 \overline{) 16}$	$\frac{1}{64} 500 \overline{) 078125}$	$\frac{1}{3} 20 \overline{) 666}$		
	75	448	18		
	450	520	* 20		
	450	512	18		
	0	80	20		
		64	18		
		160	20		
		128			
		320			
		320			
4 th . $\frac{1}{8} = .833$	5 th . $\frac{1}{27} = .259$	6 th . $\frac{1}{27} = .3, 18, 18,$			
$\frac{1}{6} 50 \overline{) 83}$	$\frac{1}{27} 70 \overline{) 259}$	$\frac{1}{22} 70 \overline{) 31818}$			
48	54	66			
* 20	160	* 40			
18	135	22			
20	250	180			
18	243	170			
20	* 70	* 40			
		22			
		180			

The reason of this operation will be evident, if we consider that the numerator of a vulgar fraction is understood to be divided by the denominator; and this division is actually performed when it is reduced to a decimal.

In like manner, when there is a remainder left in division, we may extend the quotient to a decimal, instead of completing it by a vulgar fraction, as in the following example.

25) 646 (25 $\frac{1}{7}$ or 25.84.
50
146
125
Rem. 21.0
200
100
100
0

From the foregoing examples, we may distinguish the several kinds of decimals. Some vulgar fractions may be reduced exactly to decimals, as Ex. 1st, and 2^d, and are called *terminate* or *finite decimals*. Others cannot be exactly reduced, because the division always leaves a remainder; but, by continuing the division, we will perceive how the decimal may be extended to any length whatever. These are called *infinite decimals*. If the same figure continually returns, as in Ex. 3^d, and 4th, they are called *repeaters*. If two or more figures return in their order, they are called *circulaters*. If this regular succession go on from the beginning, they are called *pure repeaters*, or *circulaters*,

as Ex. 3^d. and 5th. If otherwise, as Ex. 4th and 6th, they are mixed repeaters or circulaters, and the figures prefixed to those in regular succession are called the *finite part*. Repeating figures are generally distinguished by a dash, and circulates by a comma, or other mark, at the beginning and end of the circle; and the beginning of a repeater or circulate is pointed out in the division by an asterisk.

Lower denominations may be considered as fractions of higher ones, and reduced to decimals accordingly. We may proceed by the following rule, which is the same, in effect, as the former.

To reduce lower denominations to decimals of higher:

“ Annex a cypher to the lower denomination, and divide it by the value of the higher. When there are several denominations, begin at the lowest, and reduce them in their order.”

Ex. To reduce 5 cwt. 2 qr. 21 lb. to a decimal of a ton?

28) 210 (.75	4) 2.75 (.6875	20) 5.6874 (.284375
196	24	40
140	35	168
140	32	160
0	30	87
	28	80
	20	75
	20	60
	0	150
		140
		100
		100
		0

Here, in order to reduce 21 lb. to a decimal of 1 qr. we annex a cypher, and divide by 28, the value of 1 qr. This gives .75. Then we reduce 2.75 qrs. to a decimal of 1 cwt. by dividing by 4, the value of 1 cwt. and it comes to .6875. Lastly, 5.6875 cwt. is reduced to a decimal of a ton by dividing by 20, and comes to .284375.

To value a decimal fraction: “ Multiply it by the value of the denomination, and cut off as many decimal places from the product as there are in the multiplicand. The rest are integers of the lower denomination.”

Example. What is the value of .425 of L. 1.

.425
20
fl. 8.500
6
d. 3.000

SECT. II. ARITHMETIC OF TERMINATE DECIMALS.

27

THE value of decimal places decrease like that of integers, ten of the lower place in either being equal to one of the next higher; and the same holds in passing from decimals to integers. Therefore, all the operations are performed in the same way with decimals, whether

Decimal
Fractions.

Decimal
Fractions.

whether placed by themselves, or annexed to integers, as with pure integers. The only peculiarity lies in the arrangement and pointing of the decimals.

In addition and subtraction, "Arrange units under "units, tenth-parts under tenth-parts, and proceed as "in integers."

32.035	from 13.348	and 12.248
116.374	take 9.2993	10.6752
160.63		
12.3645	4.0487	1.5728

321.4035

In multiplication, "Allow as many decimal places in the product as there are in both factors. If the "product has not so many places, supply them by "prefixing cyphers on the left hand."

Ex. 1 st .]	1.37	2 ^d .]	43.75	3 ^d .]	.1572
	1.8		.48		.12
	1096		35700		.01864
	137		17500		
	2.466		21.0000		

The reason of this rule may be explained, by observing, that the value of the product depends on the value of the factors; and since each decimal place in either factor diminishes its value ten times, it must equally diminish the value of the product.

To multiply decimals by 10, move the decimal point one place to the right; to multiply by 100, 1000, or the like, move it as many places to the right as there are cyphers in the multiplier.

In division, "Point the quotient so, that there may "be an equal number of decimal places in the dividend as in the divisor and quotient together."

Therefore, if there be the same of decimal places in the divisor and dividend, there will be as many in the quotient.

If there be more in the dividend, the quotient will have as many as the dividend has more than the divisor.

If there be more in the divisor, we must annex (or suppose annexed) as many cyphers to the dividend, as may complete the number in the divisor, and all the figures of the quotient are integers.

If the division leave a remainder, the quotient may be extended to more decimal places; but these are not regarded in fixing the decimal point.

The reason for fixing the decimal point, as directed, may be inferred from the rule followed in multiplication. The quotient multiplied by the divisor produces the dividend; and therefore the number of decimal places in the dividend is equal to those in the divisor and quotient together.

The first figure of the quotient is always at the same distance from the decimal point, and on the same side as the figure of the dividend, which stands above the unit place of the first product. This also takes place in integers; and the reason is the same in both.

It was formerly observed, that numbers were diminished when multiplied by proper fractions, and increased when divided by the same. Thus, multiplication by fractions corresponds with division by integers; and division by fractions with multiplication by integers; when we multiply by $\frac{1}{2}$ or $\frac{1}{5}$, we obtain the same an-

swer as when we divide by 2, and every integer has a correspondent decimal, which may be called its *reciprocal*. Multiplication by that decimal supplies the place of division by the integer, and division supplies the place of multiplication.

To find the reciprocal of any number, divide 1 with cyphers annexed by that number.

Ex. Required the reciprocal of 625.

625)1.000(.0016

625

3750

3750

0

The product of any number multiplied by .0016 is the same as the quotient divided by 625. Example.

625)9375(15

625

3125

3125

0

Because .0016 is $\frac{1}{625}$ of unity, any number multiplied by that fraction will be diminished 625 times. For a like reason, the quotient of any number divided by .0016, will be equal to the product of the same multiplied by 625. Example.

.0016)516.0000(322500

48

36

32

40

32

80

80

0

15.0000

9375

.0016

56250

9375

516

625

2580

1032

3096

322500

SECT. III. APPROXIMATE DECIMALS.

28

It has been shown, that some decimals, though extended to any length, are never complete: and others, which terminate at last, sometimes consist of so many places, that it would be difficult in practice to extend them fully. In these cases, we may extend the decimal to three, four, or more places, according to the nature of the articles, and the degree of accuracy required, and reject the rest of it as inconsiderable. In this manner we may perform any operation with ease by the common rules, and the answers we obtain are sufficiently exact for any purpose in business. Decimals thus restricted are called *approximates*.

Shillings, pence, and farthings, may be easily reduced to decimals of three places, by the following rule. Take half the shillings for the first decimal place, and the number of farthings increased by 1, if it amount to 24, or upwards; by two, if it amount to 48 or upwards; and by three, if it amount to 72, or upwards, for the two next places.

The reason of this is, that 20 shillings make a pound, two shillings is the tenth part of a pound; and there-

Decimal Fractions. fore half the number of shillings makes the first decimal place. If there were 50 farthings in a shilling, or 1000 in a pound, the units of the farthings in the remainder would be thousandth-parts, and the tens would be hundredth-parts, and so would give the two next decimal places; but because there are only 48 farthings in a shilling, or 960 in a pound, every farthing is a little more than the thousandth-part of a pound; and since 24 farthings make 25 thousandth-parts, allowance is made for that excess by adding 1 for every 24 farthings, as directed.

If the number of farthings be 24, 48, or 72, and consequently the second and third decimal places 25, 50, and 75, they are exactly right; otherwise they are not quite complete, since there should be an allowance of $\frac{1}{24}$ not only for 24, 48, and 72 farthings, but for every other single farthing. They may be completed by the following rule: Multiply the second and third decimal places, or their excess above 25, 50, 75, by 4. If the product amount to 24 or upwards, add 1; if 48, add 2; if 72, add 35. By this operation we obtain two decimal places more; and by continuing the same operation, we may extend the decimal till it terminate in 25, 50, 75, or in a repeater.

Decimals of sterling money of three places may easily be reduced to shillings, pence, and farthings, by the following rule. Double the first decimal place, and if the second be 5 or upwards, add 1 thereto for shillings. Then divide the second and third decimal places, or their excess above 50, by 4, first deducing 1, if it amount to 25, or upwards; the quotient is pence, and the remainder farthings.

As this rule is the converse of the former one, the reason of the one may be inferred from that of the other. The value obtained by it, unless the decimal terminate in 25, 50, or 75, is a little more than the true value; for there should be a deduction not only of 1 for 25, but a like deduction of $\frac{1}{24}$ on the remaining figures of these places.

We proceed to give some examples of the arithmetic of approximates, and subjoin any necessary observations.

ADDITION.		SUBTRACTION.	
<i>Cwt. qrs. lb.</i>		<i>Cwt. qrs. lb.</i>	
3	2 14 = 3.625	3	2 2 = 3.51785
2	3 22 = 2.94642	1	1 19 = 1.41964
3	3 19 = 3.91964		
4	1 25 = 4.47321	2	— 9 2.09821

14 3 24 14.96427

If we value the sum of the approximates, it will fall a little short of the sum of the articles, because the decimals are not complete.

Some add 1 to the last decimal place of the approximate, when the following figure would have been 5, or upwards. Thus the full decimal of 3 qrs. 22lb. is .946428571, and therefore .94643 is nearer to it than .94642. Approximates, thus regulated, will in general give exacter answers, and sometimes above the true one, sometimes below it.

The mark + signifies that the approximate is less than the exact decimal, or requires something to be added. The mark — signifies that it is greater, or requires something to be subtracted.

MULTIPLICATION.

8278 +	<i>Meth. 2^d.</i>	8278	<i>Meth. 3^d.</i>	8278
2153 +		2153		3512
24834	16556			16556
41390	8278			827
8278	41390			413
16556	24834			24

1782|2534 1782|2534 1782

Here the four last places are quite uncertain. The right-hand figure of each particular product is obtained by multiplying 8 into the figures of the multiplier; but if the multiplicand had been extended, the carriage from the right-hand place would have been taken in; consequently the right-hand place of each particular product, and the four places of the total product, which depend on these, are quite uncertain. Since part of the operation, therefore, is useless, we may omit it; and, for this purpose, it will be convenient to begin (as in p. 658. col. 1. *fifth* variety) at the highest place of the multiplier. We may perceive that all the figures on the right hand of the line in Method 2. serve no purpose, and may be left out, if we only multiply the figures of the multiplicand, whose products are placed on the right-hand of the line. This is readily done by inverting the multiplier in Method 3. and beginning each product with the multiplication of that figure which stands above the figure of the multiplier that produces it, and including the carriage from the right-hand place.

If both factors be approximates, there are as many uncertain places, at least in the product, as in the longest factor. If only one be an approximate, there are as many uncertain places as there are figures in that factor, and sometimes a place or two more, which might be affected by the carriage. Hence we may infer, how far it is necessary to extend the approximates, in order to obtain the requisite number of certain places in the product.

DIVISION.

.3724—	798 64327+(2144 or 3724)	79864327(2144
	7448	7448
	5384	538
	3724	372
	16602	166
	14896	148
	17063	18
	14892	14
	2171	4

Here all the figures on the right hand of the line are uncertain; for the right-hand figure of the first product 7448 might be altered by the carriage, if the divisor were extended; and all the remainders and dividends that follow are thereby rendered uncertain. We may omit these useless figures; for which purpose, we dash a figure on the right hand of the divisor at each step, and neglect it when we multiply by the figure of the quotient next obtained: but we include the carriage. The operation, and the reason of it, will appear clear, by comparing the operation at large, and contracted, in the above example.

Interminate
Decimals.

Ex. $\frac{1}{4} = .03125$, a decimal of 5 places, and $32 = 2^5$.
 $32 \times 1.00000(.03125)$
 960000

Interminate
Decimals.

CHAP. X. INTERMINATE DECIMALS.

29

SECT. I. REDUCTION OF INTERMINATE DECIMALS.

As the arithmetic of interminate decimals, otherwise called the *arithmetic of infinites*, is facilitated by comparing them with vulgar fractions, it will be proper to inquire what vulgar fractions produce the several kinds of decimals, terminate or interminate, repeaters or circulates, pure or mixed. And, first, we may observe, that vulgar fractions, which have the same denominator, produce decimals of the same kind. If the decimals corresponding to the numerator 1 be known, all others are obtained by multiplying these into any given numerator, and always retain the same form, providing the vulgar fraction be in its lowest terms.

Thus, the decimal equal to $\frac{1}{4}$ is $.12857$,
 which multiplied by $\frac{3}{4}$

produces the decimal equal to $\frac{3}{4}$, $.428571$,

Secondly, If there be cyphers annexed to the significant figures of the denominator, there will be an equal number of additional cyphers prefixed to the decimal. The reason of this will be evident, if we reduce these vulgar fractions to decimals, or if we consider that each cypher annexed to the denominator diminishes the value of the vulgar fraction ten times, and each cypher prefixed has a like effect on the value of the decimal.

Thus, $\frac{1}{70} = .142857$, $\frac{1}{700} = .0142857$, $\frac{1}{7000} = .00142857$,
 $\frac{1}{70} = .0142857$, $\frac{1}{700} = .0028571$, $\frac{1}{7000} = .00042857$,

We may therefore confine our attention to vulgar fractions, whose numerator is 1, and which have no cyphers annexed to the significant figures of the denominator.

Thirdly, Vulgar fractions, whose denominators are 2 or 5, or any of their powers, produce terminate decimals; for, if any power of 2 be multiplied by the same power of 5, the product is an equal power of 10, as appears from the following table:

2	×	5	=	10
2 ³ or 4	×	5 ² or 25	=	100 or 10 ²
2 ⁴ or 8	×	5 ³ or 125	=	1000 or 10 ³
2 ⁵ or 16	×	5 ⁴ or 625	=	10000 or 10 ⁴
2 ⁶ or 32	×	5 ⁵ or 3125	=	100000 or 10 ⁵

And the reason is easily pointed out; for $2^3 \times 5^3 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$, or, because the factors may be taken in any order, $= 2 \times 5 \times 2 \times 5 \times 2 \times 5$; and this, if we multiply the factors by pairs, becomes $10 \times 10 \times 10$, or 10^3 . The like may be shown of any other power. And we may infer, that, if any power of 10 be divided by a like power of 2 or 5, the quotient will be an equal power of 5 or 2 respectively, and will come out exact, without a remainder; and, since the vulgar fractions above mentioned are reduced to decimals by some such division, it follows that the equivalent decimals are terminate.

The number of places in the decimal is pointed out by the exponent of the power; for the dividend must be a like power of 10, or must have an equal number of cyphers annexed to 1, and each cypher of the dividend gives a place of the quotient.

40
32
80
64
160
160

Again, no denominators except 2, 5, or their powers, produce terminate decimals. It is obvious from p. 661. col. 2. par. 4. that, if any denominator which produces a terminate decimal be multiplied thereby, the product will consist of 1, with cyphers annexed; and consequently the lowest places of the factors, multiplied into each other, must amount to 10, 20, or the like, in order to supply a cypher for the lowest place of the product; but none of the digits give a product of this kind, except 5 multiplied by the even numbers: therefore one of the factors must terminate in 5, and the other in an even number. The former is measured by 5, and the latter by 2, as was observed p. 660. col. 2. par. 7. Let them be divided accordingly, and let the quotients be multiplied. This last product will be exactly one tenth-part of the former; and therefore will consist of 1, with cyphers annexed, and the factors which produce it are measured by 5 and 2, as was shewn before. This operation may be repeated; and one of the factors may be divided by 5, and the other by 2, till they be exhausted; consequently they are powers of 5 and 2.

Fourthly, Vulgar fractions, whose denominators are 3 or 9, produce pure repeating decimals.

Thus, $\frac{1}{3} = .111$	$\frac{1}{4} = .555$
$\frac{1}{6} = .222 \frac{1}{3}$ or $.066$	$\frac{1}{8} = .125$
$\frac{1}{9} = .333$	$\frac{1}{10} = .1$
$\frac{1}{12} = .083 \frac{1}{3}$	$\frac{1}{11} = .090909$
$\frac{1}{18} = .055 \frac{1}{9}$	$\frac{1}{13} = .076923$
$\frac{1}{27} = .037 \frac{1}{27}$	$\frac{1}{14} = .071428$
$\frac{1}{36} = .027 \frac{1}{36}$	$\frac{1}{15} = .066666$
$\frac{1}{45} = .022 \frac{1}{45}$	$\frac{1}{16} = .0625$
$\frac{1}{54} = .018 \frac{1}{54}$	$\frac{1}{17} = .058823$
$\frac{1}{63} = .015873$	$\frac{1}{18} = .055555$
$\frac{1}{72} = .013888$	$\frac{1}{19} = .052631$
$\frac{1}{81} = .012345$	$\frac{1}{20} = .05$
$\frac{1}{90} = .011111$	$\frac{1}{21} = .047619$
$\frac{1}{108} = .009259$	$\frac{1}{22} = .045454$
$\frac{1}{126} = .007936$	$\frac{1}{23} = .043478$
$\frac{1}{135} = .007407$	$\frac{1}{24} = .041666$
$\frac{1}{144} = .006944$	$\frac{1}{25} = .04$
$\frac{1}{162} = .006172$	$\frac{1}{26} = .038461$
$\frac{1}{180} = .005555$	$\frac{1}{27} = .037037$
$\frac{1}{198} = .005050$	$\frac{1}{28} = .035714$
$\frac{1}{216} = .004629$	$\frac{1}{29} = .034482$
$\frac{1}{225} = .004444$	$\frac{1}{30} = .033333$
$\frac{1}{243} = .004126$	$\frac{1}{31} = .032258$
$\frac{1}{252} = .003968$	$\frac{1}{32} = .03125$
$\frac{1}{270} = .003703$	$\frac{1}{33} = .030303$
$\frac{1}{288} = .003472$	$\frac{1}{34} = .029411$
$\frac{1}{306} = .003268$	$\frac{1}{35} = .028571$
$\frac{1}{324} = .003086$	$\frac{1}{36} = .027777$
$\frac{1}{342} = .002923$	$\frac{1}{37} = .027027$
$\frac{1}{360} = .002777$	$\frac{1}{38} = .026315$
$\frac{1}{378} = .002645$	$\frac{1}{39} = .025641$
$\frac{1}{396} = .002525$	$\frac{1}{40} = .025$
$\frac{1}{405} = .002469$	$\frac{1}{41} = .024390$
$\frac{1}{420} = .002380$	$\frac{1}{42} = .023809$
$\frac{1}{432} = .002314$	$\frac{1}{43} = .023255$
$\frac{1}{440} = .002272$	$\frac{1}{44} = .022727$
$\frac{1}{450} = .002222$	$\frac{1}{45} = .022222$
$\frac{1}{468} = .002136$	$\frac{1}{46} = .021739$
$\frac{1}{486} = .002059$	$\frac{1}{47} = .021276$
$\frac{1}{504} = .001984$	$\frac{1}{48} = .020833$
$\frac{1}{522} = .001915$	$\frac{1}{49} = .020408$
$\frac{1}{540} = .001851$	$\frac{1}{50} = .02$
$\frac{1}{567} = .001763$	$\frac{1}{51} = .019607$
$\frac{1}{585} = .001692$	$\frac{1}{52} = .019230$
$\frac{1}{603} = .001625$	$\frac{1}{53} = .018867$
$\frac{1}{620} = .001596$	$\frac{1}{54} = .018518$
$\frac{1}{639} = .001565$	$\frac{1}{55} = .018181$
$\frac{1}{658} = .001535$	$\frac{1}{56} = .017857$
$\frac{1}{676} = .001509$	$\frac{1}{57} = .017543$
$\frac{1}{695} = .001483$	$\frac{1}{58} = .017241$
$\frac{1}{714} = .001458$	$\frac{1}{59} = .016949$
$\frac{1}{732} = .001434$	$\frac{1}{60} = .016666$
$\frac{1}{750} = .001407$	$\frac{1}{61} = .016393$
$\frac{1}{768} = .001381$	$\frac{1}{62} = .016129$
$\frac{1}{786} = .001356$	$\frac{1}{63} = .015873$
$\frac{1}{805} = .001331$	$\frac{1}{64} = .015625$
$\frac{1}{824} = .001307$	$\frac{1}{65} = .015384$
$\frac{1}{843} = .001283$	$\frac{1}{66} = .015151$
$\frac{1}{862} = .001260$	$\frac{1}{67} = .014925$
$\frac{1}{881} = .001237$	$\frac{1}{68} = .014705$
$\frac{1}{900} = .001215$	$\frac{1}{69} = .014492$
$\frac{1}{918} = .001193$	$\frac{1}{70} = .014285$
$\frac{1}{937} = .001171$	$\frac{1}{71} = .014084$
$\frac{1}{956} = .001150$	$\frac{1}{72} = .013888$
$\frac{1}{975} = .001129$	$\frac{1}{73} = .013698$
$\frac{1}{994} = .001108$	$\frac{1}{74} = .013513$
$\frac{1}{1013} = .001088$	$\frac{1}{75} = .013333$
$\frac{1}{1032} = .001068$	$\frac{1}{76} = .013157$
$\frac{1}{1051} = .001048$	$\frac{1}{77} = .012987$
$\frac{1}{1070} = .001028$	$\frac{1}{78} = .012820$
$\frac{1}{1089} = .001009$	$\frac{1}{79} = .012658$
$\frac{1}{1108} = .001000$	$\frac{1}{80} = .012500$
$\frac{1}{1127} = .000980$	$\frac{1}{81} = .012345$
$\frac{1}{1146} = .000961$	$\frac{1}{82} = .012195$
$\frac{1}{1165} = .000942$	$\frac{1}{83} = .012048$
$\frac{1}{1184} = .000923$	$\frac{1}{84} = .011904$
$\frac{1}{1203} = .000904$	$\frac{1}{85} = .011764$
$\frac{1}{1222} = .000885$	$\frac{1}{86} = .011626$
$\frac{1}{1241} = .000866$	$\frac{1}{87} = .011490$
$\frac{1}{1260} = .000847$	$\frac{1}{88} = .011357$
$\frac{1}{1279} = .000828$	$\frac{1}{89} = .011226$
$\frac{1}{1298} = .000809$	$\frac{1}{90} = .011098$
$\frac{1}{1317} = .000790$	$\frac{1}{91} = .010972$
$\frac{1}{1336} = .000771$	$\frac{1}{92} = .010848$
$\frac{1}{1355} = .000752$	$\frac{1}{93} = .010726$
$\frac{1}{1374} = .000733$	$\frac{1}{94} = .010606$
$\frac{1}{1393} = .000714$	$\frac{1}{95} = .010488$
$\frac{1}{1412} = .000695$	$\frac{1}{96} = .010370$
$\frac{1}{1431} = .000676$	$\frac{1}{97} = .010254$
$\frac{1}{1450} = .000657$	$\frac{1}{98} = .010139$
$\frac{1}{1469} = .000638$	$\frac{1}{99} = .010025$
$\frac{1}{1488} = .000619$	$\frac{1}{100} = .01$

The repeating figure is always the same as the numerator. Hence we infer, that repeating figures signify ninth-parts; a repeating 3 signifies $\frac{1}{3}$; a repeating 6 signifies $\frac{1}{6}$; and a repeating 9 signifies $\frac{1}{9}$, or 1.

The value of repeating decimals may also be illustrated by collecting the values of the different places: for example, let the value of $.111$ be required; the first decimal place signifies $\frac{1}{10}$, the next $\frac{1}{100}$, the next $\frac{1}{1000}$. The sum of the two first places is $\frac{11}{100}$, of the three places $\frac{111}{1000}$, and so on. If we subtract these values successively from $\frac{1}{9}$, the first remainder is $\frac{1}{90}$, the second $\frac{1}{900}$, the third $\frac{1}{9000}$. Thus, when the value of the successive figures is reckoned, the amount of them approaches nearer and nearer to $\frac{1}{9}$, and the difference becomes 10 times less for each figure assumed; and, since the decimal may be extended to any length, the difference will at last become so small, that it need not be regarded. This may give a notion of a decreasing series, whose sum may be exactly ascertained, though the number of terms be unlimited.

Fifthly, Vulgar fractions, whose denominators are a product of 3 or 9 multiplied by 2, 5, or any of their powers, produce mixed repeaters. The reason of this will be evident, if, in forming the decimal, we divide the numerator successively by the component parts of the denominator, as directed p. 660. col. 1. par. ult.

Interminate
Decimals.

Interminate
Decimals.

&c. The first divisor is 2, 5, or some of their powers, and consequently gives a finite quotient by p. 679. col. 1. par. 3. &c. The second divisor is 3 or 9; and therefore, when the figures of the dividend are exhausted, and figures annexed to the remainder, the quotient will repeat, by p. 679. col. 2. par. 2.

Ex. $\frac{1}{3} \times 144 = 16 \times 9$.

144) 1.000(.00694	or 16) 1.00(.0625
864	96.00694
1360	40
1296	32
* 640	80
576	80
640	0

In order to illustrate this subject further, we shall explain the operation of calling out the threes, which resembles that for calling out the nines, formerly laid down, p. 663. col. 2. par. 4.—p. 664. col. 2. par. 3. and depends on the same principles, being a method of finding the remainder of a number divided by 3. If the same number be divided by 3 and by 9, the remainders will either agree, or the second remainder will exceed the first by 3 or by 6. The reason of this will be obvious, if we suppose a collection of articles assorted into parcels of 3, and afterwards into parcels of 9, by joining three of the former together. If the lesser parcels be all taken up in composing the greater ones, the remainder will be the same at the end of the second assortment as before; but, if one of these lesser parcels be left over, the remainder will be more, and if two of them be left over, the remainder will be 6 more. Therefore, when the nines are cast out from any number, and the result divided by 3, the remainder is the same as when the number is divided by 3: Thus, the results on calling out the 3's may be derived from those obtained by calling out the 9's; and the same correspondence which was pointed out with respect to the latter, for proving the operations of arithmetic, applies also to the former.

To cast out the 3's from any number, add the figures, neglecting 3, 6, and 9; and when the sum amounts to 3, 6, or 9, reject them, and carry on the computation with the excess only. For example, take 286754: in casting out the 3's, we compute thus, 2 and 8 is 10, which is three times 3, and 1 over; 1 and (passing by 6) 7 is 8, which is twice 3, and 2 over; 2 and 5 is 7, which is twice 3, and 1 over; 12/ly, 1 and 4 is 5, which contains 3 once, and 2 over; so the result is 2.

If the 3's be cast out from 2^3 or 4, the result is 1; from 2^5 or 8, the result is 2; from 2^4 or 16, the result is 1; and universally the odd powers of 2 give a result of 2, and the even powers give a result of 1. As every higher power is produced by multiplying the next lower by 2, the result of the product may be found by multiplying the result of the lower power by 2, and casting out the 3's, if necessary. Therefore, if the result of any power be 1, that of the next higher is 2, and that of the next higher (4 with the 3's cast out or) 1. Thus the results of the powers of 2 are 1 and 2 by turns; also, because the result of 5, when the 3's are cast out, is 2, its powers will have the same results as the corresponding powers of 2.

If the denominator be a product of an even power of 2 or 5, multiplied by 3, the repeating figure of the corresponding decimal is 3; but, if it be the product of an odd power, the repeating figure is 6. For, in forming the decimal, we may divide by the component parts of the denominator, and the first divisor is a power of 2 or 5; therefore the first quotient is a like power of 4 or 2, (p. 679. col. 1. par. 3. &c.) and this power is again divided by 3. If it be an even power, the remainder or result is 1, as was demonstrated above; and if cyphers be annexed to the remainder, and the division continued, it quotes a repeating 3; but if it be an odd power, the remainder is 2, and the quotient continued by annexing cyphers is a repeating 6.

If the denominator be 9, multiplied by 2, or any of its powers, the repeating figure may be found by casting out the 9's from the corresponding power of 5; and, if it be multiplied by 5 or any of its powers, by casting out the 9's from the corresponding power of 2. For if the decimal be formed by two divisions, the first quotes the corresponding power; and the second, because the divisor is 9, repeats the resulting figure after the dividend is exhausted.

If any mixed repeater be multiplied by 9, the product is a terminate decimal, and may be reduced (p. 679. col. 1. par. 3. &c.) to a vulgar fraction, whose denominator is 2, 5, or some of their powers; therefore all mixed repeaters are derived from vulgar fractions, whose denominators are products of 2, 5, or their powers, multiplied by 3 or 9.

Sixthly, All denominators, except 2, 5, 3, 9, the powers of 2 and 5, and the products of these powers, multiplied by 3 or 9, produce circulating decimals. We have already shewn, that all terminate decimals are derived from 2, 5, or their powers; all pure repeaters, from 3 or 9; and all mixed repeaters, from the products of the former multiplied by the latter. The number of places in the circle is never greater than the denominator diminished by unity. Thus $\frac{1}{4}$ produces .142857, a decimal of 6 places; and $\frac{1}{7}$ produces .0588235294117647, a decimal of 16 places. The reason of this limit may be inferred from the division; for whenever a remainder which has recurred before returns again, the decimal must circulate, and the greatest number of possible remainders is one less than the divisor: But frequently the circle is much shorter. Thus $\frac{1}{2} = .09$, a circle of 2 places.

When a vulgar fraction, whose numerator is 1, produces a pure circulate, the product of the circle multiplied by the denominator will consist of as many 9's as there are places in the circle. Thus $\frac{1}{7} = .142857$, which multiplied by 7 produces 999999. The like holds in every decimal of the same kind; for they are formed by dividing 10, or 100, or 1000, or some like number, by the denominator, and the remainder is 1, when the decimal begins to circulate; for the division must be then exactly in the same state as at the beginning: Therefore if the dividend had been less by 1, or had consisted entirely of 9's, the division would have come out without a remainder; and, since the quotient, multiplied by the divisor, produces the dividend, as was shown p. 661. col. 2. par. 3. it follows, that the circulating figures, multiplied by the denominator, produce an equal number of 9's.

Every vulgar fraction, which produces a pure circulate,

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late, is equal to one whose numerator is the circulating figures, and its denominator a like number of 9's. If the numerator be 1, the vulgar fraction is reduced to that form by multiplying both terms into the circle of the decimal; and, if the numerator be more than 1, the equivalent decimal is found by multiplying that which corresponds to the numerator 1 into any other numerator.

remainder of 1 or 2. If the first remainder be 1, the second remainder is 2, (because, if 1 is prefixed to the repeating figure, and the 3's be cast out, the result is 2); and, for a like reason, the third dividend clears off without a remainder. If the first remainder be 2, the second is (twice 2 or 4, with the 3's cast out, or) 1, and the third 0; so the circle is always complete at 3 places, and the division begins anew. The sum of such a circle cannot be a multiple of 3; for, since the repeating figure is not 3, nor any of its multiples, the sum of 3 places is not a multiple of 9, and therefore cannot be divided by 9, nor twice by 3, without a remainder.

Thus $\frac{1}{7} = .142857, = \frac{142857}{1000000}$ and $\frac{1}{3} = .027 = \frac{27}{1000}$
 $\frac{2}{7} = .285714, = \frac{285714}{1000000}$ $\frac{2}{3} = .654 = \frac{654}{1000}$
 $\frac{3}{7} = .428571, = \frac{428571}{1000000}$ $\frac{3}{7} = .216 = \frac{216}{1000}$

Hence we may infer, that pure circulates are equal in value to vulgar fractions whose numerators consist of the circulating figures, and denominators of as many 9's as there are places in the circle. To place this in another point of view, we shall reduce a vulgar fraction, whose numerator consists entirely of 9's, to a decimal.

$$\begin{array}{r} 999 \overline{) 375000} \\ \underline{999} \\ 2997 \\ \underline{2997} \\ 7530 \\ \underline{6993} \\ 5370 \\ \underline{4995} \\ 375 \end{array}$$

The remainder is now the same as the dividend, and therefore the quotient must circulate; and, in general, since any number with 3 cyphers annexed, may be divided by 1000, without a remainder, and quotes the significant figures; therefore, when divided by 999, it must quote the same figures, and leave an equal remainder. This also applies to every divisor which consists entirely of 9's. Circles of two places, therefore, signify ninety ninth-parts; circles of 3 places signify nine hundred and ninety ninth-parts; and so on.

The value of circulating decimals may also be illustrated by adding the values of the places. Thus, if two figures circulate, the first circle signifieth hundredth-parts, and every following circle signifies one hundred times less than the preceding; and their values added, as in p. 679. col. 2. par. 3. will approach nearer to ninety ninth-parts than any assigned difference, but will never exactly complete it.

All denominators which are powers of 3, except 9, produce pure circulates; and the number of places in the circle is equal to the quotient of the denominator divided by 9.

Thus, $\frac{1}{27}=.037$, a circle of 3 places, and 27 divided by 9=3.

$\frac{1}{81} = .012345679$, a circle of 9 places, and 81 divided by 9 = 9.

These decimals may be formed, by dividing the numerator by the component parts of the denominator. In the first example, the component parts of the numerator are 9 and 3. The division by 9 quotes a pure circulate, and the circulating figure is not 3, 6, or 9, if the vulgar fraction be in its lowest terms. And any other repeating figure divided by 3, quotes a pure circulate of 3 places; for the first dividend must leave a

Again, if the decimal equal to $\frac{1}{3}$ be divided by 3, we shall obtain the decimal equal to $\frac{1}{9}$. The dividend, as we have shewn already, is a pure circulate of 3 places, whose sum is not a multiple of 3. Therefore, when divided by 3, the first circle leaves a remainder of 1 or 2, which being prefixed to the second, and the division continued, the remainder, at the end of the second circle, is 2 or 1, and, at the end of the third circle, there is no remainder; all which may be illustrated by calling out the 3's. The division being completed at 9 places, finishes the circle; and it may be shewn, as before, that the sum of these places is not a multiple of 3. The learner will apprehend all this if he reduce these, or the like vulgar fractions, to decimals, by successive divisions.

$27 = 9 \times 3$, and $9)1.0(.111\bar{1}$, and $3)111\bar{1}(.037$,
 $81 = 27 \times 3$, and $3)037,037,037(.012345679$.

For the same reason, if any circulating decimal, not a multiple of 3, be divided by 3, the quotient will circulate thrice as many places as the dividend; and, if any circulate obtained by such division be multiplied by 3, the circle of the product will be restricted to one third of the places in the multiplicand.

All vulgar fractions, whose denominators are multiples of 2, 5, or their powers, except those already considered, produce mixed circulates; for they may be reduced by dividing by the component parts of the denominator. The first divisor is 2, 5, or some of their powers, and therefore gives a finite quotient. The second divisor is none of the numbers enumerated p. 680. col. 2. par. 2. and therefore gives a circulating quotient when the significant figures of the dividend are exhausted, and cyphers annexed to the remainder.

Ex. $\frac{1}{118}$	$216=27 \times 8,$
$216) 1.000(.004,629,$	or $8) 1.000$
<u>864</u>	$27) .125(.004,629,$
	<u>108</u>
* <u>1360</u>	
<u>1296</u>	* <u>170</u>
	<u>162</u>
<u>640</u>	
<u>432</u>	<u>80</u>
	<u>54</u>
<u>2080</u>	
<u>1944</u>	<u>260</u>
	<u>243</u>
* <u>1360</u>	
	<u>17</u>

All mixed circulates are derived from vulgar fractions

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tions of this kind, whose denominators are multiples of 2, 5, or their powers; and therefore all other denominators, except 3 and 9, produce pure circulates. The reader will easily perceive, that, when a decimal is formed from a vulgar fraction, whose numerator is 1, when the remainder 1 occurs in the division, the decimal is a pure circulate; but, if any other remainder occurs twice, the decimal is a mixed circulate. We are to show that this last will never happen, unless the divisor be a multiple of 2, 5, or their powers. If two numbers be prime to each other, their product will be prime to both; and, if two numbers be propofed, whereof the first does not measure the second, it will not measure any product of the second, if the multiplier be prime to the first. Thus, because 7 does not measure 12 it will not measure any product of 12 by a multiplier prime to 7. For instance, it will not measure 12×3 , or 36. Otherwise, the quotient of 12 divided by 7, or $1 \frac{4}{7}$ multiplied by 3, would be a whole number, and 5×3 would be measured by 7, which it cannot be, since 5 and 3 are both prime to 7.

Now, if we inspect the foregoing operation, we shall perceive that the product of 136, the remainder, where the decimal begins to circulate, multiplied by 999, is measured by the denominator 216. But 999 is not measured by the denominator, otherwise the decimal would have been a pure circulate; therefore 126, and 136, are not prime to each other, but have a common measure, and that measure must apply to 864, a multiple of 126, and to 1000, the sum of 136 and 864; see p. 672. col. 2. par. ult. &c. But it was proven, p. 679. col. 1. par. 1. that no numbers, except the powers of 5 and 2, measure a number consisting of 1 with cyphers annexed; consequently the denominator must be measured by a power of 2 or 5. The reader will perceive, that the exponent of the power must be the same as the number of cyphers annexed to 1, or as the number of figures in the finite part of the decimal.

We shall now recapitulate the substance of what has been said with respect to the formation of decimals. 2, 5, and their powers, produce finite decimals, by p. 679. col. 1. par. 3. &c. and the number of places is measured by the exponent of the power. 3 and 9 produce pure repeaters (p. 679. col. 2. par. 2.) The products of 2, 5, and their powers, by 3 or 9, produce mixed repeaters by p. 679. col. 2. par. ult.; their products by other multipliers, produce mixed circulates by p. 679. col. 2. par. ult.; and all numbers of which 2 and 5 are not aliquot parts, except 3 and 9, produce pure circulates. To find the form of a decimal corresponding to any denominator, divide by 2, 5, and 10, as often as can be done without a remainder; the number of divisions shows how many finite places there are in the decimal, by p. 681. col. 2. par. 3. If the dividend be not exhausted by these divisions, divide a competent number of 9's by the last quotient, till the division be completed without a remainder: the number of 9's required shows how many places there are in the circle, and the reason may be inferred from p. 680. col. 2. par. 5.

We shall conclude this subject by marking down the decimals produced by vulgar fractions, whose numerator is 1, and denominators 30; and under that the reader may observe their connection with the denominators.

$\frac{1}{2} = .5$	$\frac{1}{6} = .\dot{0}6\dot{2}5$
$\frac{1}{3} = .333$	$\frac{1}{7} = .0588235294117647,$
$\frac{1}{4} = .25$	$\frac{1}{8} = .0555\dot{5}$
$\frac{1}{5} = .2$	$\frac{1}{9} = .052631578947368421,$
$\frac{1}{6} = .166\dot{6}$	$\frac{1}{10} = .05$
$\frac{1}{7} = .142857,$	$\frac{1}{11} = .047619,$
$\frac{1}{8} = .125$	$\frac{1}{12} = .04545\dot{4},$
$\frac{1}{9} = .11\dot{1}$	$\frac{1}{13} = .0434782608695652173913,$
$\frac{1}{10} = .1$	$\frac{1}{14} = .04166\dot{6}$
$\frac{1}{11} = .09,09,$	$\frac{1}{15} = .04$
$\frac{1}{12} = .08333$	$\frac{1}{16} = .0384615,$
$\frac{1}{13} = .076923,$	$\frac{1}{17} = .037,$
$\frac{1}{14} = .0714285,$	$\frac{1}{18} = .05,571428,$
$\frac{1}{15} = .066\dot{6}$	$\frac{1}{19} = .034827586206896551724137931,$
	$\frac{1}{20} = .0333$

RULES for reducing intermediate decimals to vulgar fractions.

I. " If the decimal be a pure repeater, place the repeating figure for the numerator, and 9 for the denominator."

II. " If the decimal be a pure circulate, place the circulating figures for the numerator, and as many 9's as there are places in the circle for the denominator."

III. " If there be cyphers prefixed to the repeating or circulating figures, annex a like number to the 9's in the denominator."

IV. " If the decimal be mixed, subtract the finite part from the whole decimal. The remainder is the numerator; and the denominator consists of as many 9's as there are places in the circle, together with as many cyphers as there are finite places before the circle."

Thus, $235,62 = \frac{23562}{100000}$
From the whole decimal 23562
we subtract the finite part 235

and the remainder 23327 is the numerator.

The reason may be illustrated by dividing the decimal into two parts, whereof one is finite, and the other a pure repeater or circulate, with cyphers prefixed. The sum of the vulgar fractions corresponding to these will be the value of the decimal sought.

$.235,62$, may be divided into $.235 = \frac{235}{100000}$ by rule I. and $.000,62 = \frac{62}{999000}$ by rules II. III.

In order to add these vulgar fractions, we reduce them to a common denominator; and, for that purpose, we multiply both terms of the former by 99, which gives $\frac{23327}{999000}$; then we add the numerators.

235 or by method explained p. 658. col. 1. par. 3.

		Sum of numerators.	
2115	23500	23265	or 23562
2115	235	62	235
23265	23265	23327	23327

The value of circulating decimals is not altered, though one or more places be separated from the circle, and considered as a finite part, providing the circle be completed. For example, .27 may be written .2,72, which is reduced by the last of the foregoing rules to $\frac{272}{999}$, or $\frac{27}{99}$, which is also the value of .27. And, if two or more circles be joined, the value of the decimal is still the same. Thus, $2,727 = \frac{2727}{999}$, which is reduced by dividing the terms by 101 to $\frac{27}{99}$.

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All circulating decimals may be reduced to a similar form, having a like number both of finite and circulating places. For this purpose, we extend the finite part of each as far as the longest, and then extend all the circles to so many places as may be a multiple of the number of places in each.

Ex. .34,725, extended. $34,725725725725$,
1,4562, $14,562456245624$,

Here the finite part of both is extended to two places, and the circle to 12 places, which is the least multiple for circles of 3 and 4 places.

30

SECT. II. ADDITION and SUBTRACTION of INTERMINATE DECIMALS.

To add repeating decimals, "Extend the repeating figures one place beyond the longest finite ones, and, "when you add the right-hand column, carry to the "next by 9."

Ex. .37524	or	37524	.2	.29	$\frac{7}{9}$
.8		88888	.323	.42	$\frac{2}{9}$
.643		643	.469	.7548	$\frac{3}{9}$
.73		73333	.3	.3	$\frac{7}{9}$

264046

To subtract repeating decimals, "Extend them as directed for addition, and borrow at the right-hand "place, if necessary, by 9.

.9356	.646	.7358	.738	.469
.84738	.5342	.62563	.68	.38

.0872 $\frac{7}{9}$.1117 $\frac{7}{9}$

The reason of these rules will be obvious, if we recollect that repeating figures signify ninth-parts. If the right-hand figure of the sum or remainder be 0, the decimal obtained is finite; otherwise it is a repeater.

To add circulating decimals, "Extend them till they "become similar (p. 682. col. 1. par. ult. &c.); and, "when you add the right-hand column, include the figure which would have been carried if the circle had "been extended further.

Ex. 1 st .	Extended.	Ex. 2 ^d .	Extended.
.574,	.574,574,	.874,	.874,874874,
.2,698,	.266,869,	.1463	.146,333333,
.428	.428	.1,58,	.158,585858,
.37,983,	.379,839,	.32,	.323,232323,

1.652,284,

1.503,026390,

Note 1. Repeaters mixed with circulatres are extended and added as circulatres.

Note 2. Sometimes it is necessary to inspect two or more columns for ascertaining the carriage; because the carriage from a lower column will sometimes raise the sum of the higher, so as to alter the carriage from it to a new circle. This occurs in Ex. 2.

Note 3. The sum of the circles must be considered as a similar circle. If it consist entirely of cyphers, the amount is terminate. If all the figures be the same, the amount is a repeater. If they can be divided into parts exactly alike, the amount is a circle of fewer places; but, for the most part, the circle of the sum is similar to the extended circles.

.3,868,	.0842,	$\frac{2}{9}$.368	.003094,	$\frac{5}{9}$
.4375,	.08,42	$\frac{1}{9}$.57,	.765,	$\frac{2}{9}$
.83492,	.0,842	$\frac{8}{9}$.895	.76,	$\frac{1}{9}$
.62,	.0842	$\frac{1}{9}$.742	.765	$\frac{2}{9}$

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To subtract circulating decimals, "Extend them till "they become similar; and, when you subtract the "right-hand figure, consider whether 1 would have "been borrowed if the circles had been extended further, and make allowance accordingly.

.5,72,	.974,	or	.974974,	.8,135,	or	.8,135135,
.4,86,	.86,		.868686,	.452907,	or	.4529074,

.0,85,	1.06288,	3,606060,
		3,60,

SECT. III. MULTIPLICATION of INTERMINATE DECIMALS.

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CASE I. "When the multiplier is finite, and the "multiplicand repeats, carry by 9 when you multiply "the repeating figure: The right-hand figure of each "line of the product is a repeater; and they must be "extended and added accordingly."

Ex. .13494

.367

9446

80966

404833

.0495246

If the sum of the right-hand column be an even number of 9's, the product is finite; otherwise, it is a repeater.

CASE II. "When the multiplier is finite, and the "multiplicand circulates, add to each product of the "right-hand figure the carriage which would have "been brought to it if the circle had been extended. "Each line of the product is a circle similar to the "multiplicand, and therefore they must be extended "and added accordingly."

The product is commonly a circulate similar to the multiplicand; sometimes it circulates fewer places, repeats, or becomes finite; it never circulates more places.

Ex. .37,46,X.235

235

187,32,

1123,93,

7492,92,

.08804,19,

1. .674, X.78

2. .37, X.86

3. .625, X.42

4. .4793, X.48

5. .3,75, X.124

6. .2,963, X.36

CASE III. "When the multiplier repeats or circulates, find the product as in finite multipliers, and "place under it the products which would have arisen "from the repeating or circulating figures, if extended."

Ex. 1st. .958X.8

2^d. .784X.36,

8

36

7664

4704

7664

2352

7664

28224

7664

28224

28224

.8518

.284,09,

3^d.]

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$$\begin{array}{r}
 3^{d.}] \quad .714285, \times 54, \\
 \hline
 2859142 \\
 35714285 \\
 \hline
 38,571428 \mid 571428 \mid 571428, \\
 385714 \mid 285714 \mid 285714, \\
 3857 \mid 142857 \mid 142857, \\
 \hline
 38 \mid 571428 \mid 571428, \\
 385714 \mid 285714, \\
 3857 \mid 142875, \\
 \hline
 38 \mid 571428 \\
 385714 \\
 3857 \\
 38 \\
 \hline
 38.961038, 961038, 961038,
 \end{array}$$

It is evident, that, if a repeating multiplier be extended to any length, the product arising from each figure will be the same as the first, and each will stand one place to the right hand of the former. In like manner, if a circulating multiplier be extended, the product arising from each circle will be alike, and will stand as many places to the right hand of the former as there are figures in the circle. In the foregoing examples, there are as many of these products repeated as is necessary for finding the total product. If we place down more, or extend them further, it will only give a continuation of the repeaters or circulates.

This is obvious in Ex. 1st and 2^d. As the learner may not apprehend it so readily in Ex. 3^d, when the multiplicand is a circulate, and consequently each line of the product is also a circulate, we have divided it into columns, whose sums exhibit the successive circles. The sum of the first column is 28,961037, and there is a carriage of 1 from the right-hand column, which completes 38,961038. This one is supplied from the three first lines of the second column, the sum of which is 999999, and being increased by 1, in consequence of the carriage from the third column, amounts to 1,000000, and therefore carries 1 to the first column, and does not affect the sum of the remaining lines, which are the same as those of the first column. The third column contains two sets of these lines, which amount to 999999, besides the lines which compose the circle. Each of these sets would be completed into 1,000000 by the carriage from the 4th column, if extended, and each would carry 1 to the second column. One of these would complete the sum of the three first lines, and the other would complete the sum of the circle. In like manner, if the circles be extended ever so far, the increasing carriages will exactly answer for the increasing deficiencies, and the sum will be always a continuation of the circle; but the product could not circulate, unless the sum of the lines marked off in the second column had consisted entirely of 9's, or had been some multiple of a number of 9's; and the circles must be extended till this take place, in order to find the complete product.

The multiplication of intermediate decimals may be facilitated, by reducing the multiplier to a vulgar fraction, and proceeding as directed p. 674. col. 1.

par. 6.

Thus,

$$\begin{array}{r}
 4^{th.}] \quad .3824 \times \frac{1}{7} = \frac{3824}{7} \\
 \hline
 7 \\
 9)2.6768 \\
 \hline
 .9742 \\
 \hline
 5^{th.}] \quad .384 \times \frac{2}{3} = \frac{768}{3} \\
 \hline
 23 \\
 1152 \\
 768 \\
 \hline
 90)8.832 \\
 \hline
 .09813
 \end{array}$$

Therefore, in order to multiply by 3, we take one third-part of the multiplier; and, to multiply by 6, we take two thirds of the same. Thus,

$$\begin{array}{r}
 6^{th.}] \quad .784 = 3 \times \frac{1}{3} \\
 \hline
 3) .784 \\
 \hline
 .2613 \\
 \hline
 7^{th.}] \quad .8761 \times \frac{2}{3} = \frac{17522}{3} \\
 \hline
 2 \\
 3)1.7522 \\
 \hline
 .58406
 \end{array}$$

As the denominator of the vulgar fractions always consists of 9's, or of 9's with cyphers annexed, we may use the contraction explained p. 661. col. 1. *par. ult. &c.*; and this will lead us exactly to the same operation which was explained p. 683. col. 2. *par. ult. &c.* on the principles of decimal arithmetic.

$$\begin{array}{r}
 8^{th.}] \quad .735 \times 3,26 = \frac{2393}{3} \\
 \hline
 323 \quad 3 \\
 2205 \quad 323 \\
 1470 \\
 2205 \\
 \hline
 99)237405 \\
 237405 \\
 2374 \\
 23 \\
 \hline
 .239803
 \end{array}$$

$$\begin{array}{r}
 9^{th.}] \quad .278 \times 365 = \frac{10137}{9} \\
 \hline
 365 \\
 1390 \\
 1668 \\
 834 \\
 \hline
 999)101470, \\
 101, \\
 \hline
 .101,571,
 \end{array}$$

When the multiplier is a mixed repeater or circulate, we may proceed as in Ex. 5th and 8th; or we may divide the multiplier into two parts, of which the first is finite, and the second a pure repeater or circulate, with cyphers prefixed, and multiply separately by these, and add the products.

$$\begin{array}{r}
 \text{Thus, } .384 \times .2 \text{ or by } .2 = .0768 \text{ or thus, } .384 \\
 \text{and by } .05 = .02133 \quad .28 \\
 \hline
 .09813 \quad 9)1920 \\
 \hline
 2133 \\
 768 \\
 \hline
 .09813
 \end{array}$$

In the following examples, the multiplicand is a repeater; and therefore the multiplication by the numerator of the vulgar fraction is performed as directed p. 683. col. 2. *par. 2.*

10th.]

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$$\begin{array}{r}
 10^{\text{th.}}] .683 \times .2 = \frac{2}{5} \\
 \hline
 9) 3.416 (.37; 962, \\
 \underline{27} \\
 71 \\
 \underline{63} \\
 * 86 \\
 81 \\
 \hline
 56 \\
 \underline{54} \\
 26 \\
 \underline{18} \\
 * 86
 \end{array}$$

$$\begin{array}{r}
 11^{\text{th.}}] .63 \times .2, 39, = \frac{317}{990} \\
 \hline
 237 \quad 2 \\
 \hline
 443 \quad 237 \\
 1890 \\
 \underline{12660} \\
 99) 15010 (.15, 16, \\
 \hline
 99 \\
 \hline
 511 \\
 \underline{495} \\
 * 160 \\
 99 \\
 \hline
 610 \\
 \underline{594} \\
 * 16
 \end{array}$$

In Ex. 13th. we have omitted the products of the divisor, and only marked down the remainders. These are found, by adding the left-hand figure of the dividend to the remaining figures of the same. Thus, 363 is the first dividend, and 3, the left-hand figure, added to 63, the remaining figures, gives 66 for the first remainder; and the second dividend, 666, is completed by annexing the circulating figure 6. The reason of which may be explained as follows. The highest place of each dividend shows, in this example, how many hundreds it contains; and, as it must contain an equal number of ninety-nines, and also an equal number of units, it follows, that these units, added to the lower places, must show how far the dividend exceeds that number of ninety-nines. The figure of the quotient is generally the same as the first place of the dividend, sometimes one more. This happens in the last step of the foregoing example, and is discovered when the remainder found, as here directed, would amount to 99, or upwards; and the excess, above 99 only, must in that case be taken to complete the next dividend.

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In the following examples the multiplicand is a circulate, and therefore the multiplication by the numerator is performed as directed p. 683. col. 2. par. 4.

$$12^{\text{th.}}] .3, 81, \times 53 = \frac{48}{5}$$

$$\begin{array}{r}
 3054 \quad 48 \\
 \underline{15272}
 \end{array}$$

$$9) 0.183, 27, (.203, 63,$$

$$\begin{array}{r}
 * 032 \\
 \underline{27}
 \end{array}$$

$$\begin{array}{r}
 57 \\
 \underline{54}
 \end{array}$$

$$* 32$$

$$13^{\text{th.}}] .12, \times 03, = \frac{1}{9}$$

$$99) 36, 36 (.036730945821854912764,$$

$$\begin{array}{r}
 666 \\
 723 \\
 306 \\
 936 \\
 453 \\
 576 \\
 813 \\
 216 \\
 183 \\
 846 \\
 543 \\
 486 \\
 903 \\
 126 \\
 273 \\
 756 \\
 633 \\
 396 \\
 * 036
 \end{array}$$

$$\begin{array}{l}
 99) .01, (.000102030405060708091011121314151617181920 \\
 (112112122122222222030311223344155637383940 \\
 (11211234445464748495051525354555657585960 \\
 (6162636465666768697071727374757677787980 \\
 (818283848586878889909192939495969799,
 \end{array}$$

The number of places in the circle of the product is sometimes very great, though there be few places in the factors: but it never exceeds the product of the denominator of the multiplier, multiplied by the number of places in the circle of the multiplicand. Therefore, if the multiplier be 3 or 6, the product may circulate three times as many places as the multiplicand; if the multiplier be any other repeater, nine times as many; if the multiplier be a circulate of two places, ninety-nine times as many: thus, in the last example, .01, a circulate of two places, multiplied by .01, a circulate of two places, produces a circulate of twice 99, or 198 places. And the reason of this limit may be inferred from the nature of the operation; for the greatest possible number of remainders, including 0, is equal to the divisor 99; and each remainder may afford two dividends, if both the circulating figures, 3 and 6, occur to be annexed to it. If the multiplier circulate three places, the circle of the product, for a like reason, may extend nine hundred and ninety-nine times as far as that of the multiplicand. But the number of places is often much less.

The multiplication of interminate decimals may be proven, by altering the order of the factors, (p. 658. col. 2. par. 2.) or by reducing them both to vulgar fractions in their lowest terms, multiplying these as directed p. 673. col. 2. par. 3. and reducing the product to a decimal.

SECT. IV. DIVISION OF INTERMINATE DECIMALS.

33

CASE I. "When the dividend only is interminate, proceed as in common arithmetic; but, when the figures of the dividend are exhausted, annex the repeating figure, or the circulating figures in their order, instead of cyphers, to the remainder."

4 R

Ex.

Interminate Decimals.	Ex. 1 st .] Divide .5376 by 7. 7).5376(.76,095238,	2 ^d .] Divide .843 by 5. .5)843(.1686
	49	5
	42	34
	42	30
	* 066	43
	63	40
	36	* 33
	35	30
	16	33
	14	
	26	
	21	
	56	
	56	

* 066

In these accounts the quotient is never finite. It may repeat, if the dividend repeats; or, if the dividend circulate, it may circulate an equal number of places, often more, and never fewer. The greatest possible extent of the circle is found by multiplying the divisor into the number of places in the circle of the dividend. Thus, a circulate of 3 places, divided by 3, quotes a circulate of 3 times 3, or 9 places.

CASE II. "When the divisor is interminate, the "multiplications and subtractions must be performed, "according to the directions given for repeating and "circulating decimals."

Ex. 1st.] Divide .37845 by 8

8).37845(.68121

333333

45116

44444

672

558

116

111

8

8

0

2^d. Divide .245892 by 2,18

.2,18).245892(1.127005

218181,81,

27710,18,

21818,18,

5892,00,

4303,63,

1528,36,

1527,27,

1090,90

1090,90

0

The foregoing method is the only one which properly depends on the principles of decimal arithmetic; but it is generally shorter to proceed by the following rule.

"Reduce the divisor to a vulgar fraction, multiply "the dividend by the denominator, and divide the product by the numerator."

Ex. 1st.] Divide .37845 by $8\frac{1}{2}$

9

5)3.40605(.68121

2^d.] Divide .37848 by $6\frac{1}{2}$

3

2)1.13536(.567683

Note 1. Division by 3 triples the dividend, and division by 6 increases the dividend one half.

Note 2. When the divisor circulates, the denominator of the vulgar fraction consists of 9's, and the multiplication is sooner performed by the contraction explained p. 658. col. 1. par. 3. It may be wrought in the same way, when the divisor repeats, and the denominator, of consequence, is 9.

Note 3. If a repeating dividend be divided by a repeating or circulating divisor; or, if a circulating dividend be divided by a similar circulating dividend; or, if the number of places in the circle of the divisor be a multiple of the number in the dividend; then the product of the dividend multiplied by the denominator of the divisor will be terminate, since like figures are subtracted from like in the contracted multiplication, and consequently no remainder left. The form of the quotient depends on the divisor, as explained at large, p. 679. col. 1. par. 1.—p. 681. col. 2. par. 3.

Note 4. In other cases, the original and multiplied dividend are similar, and the form of the quotient is the same as in the case of a finite divisor. See p. 685. col. 2. par. ult. &c.

Note 5. If the terms be similar, or extended till they become so, the quotient is the same as if they were finite, and the operation may be conducted accordingly; for the quotient of vulgar fractions that have the same denominator is equal to the quotient of their numerators.

CHAP. XI. OF THE EXTRACTION OF ROOTS.

33

THE origin of powers by involution has already been explained under the article ALGEBRA, n^o 8 and 9. There now remains therefore only to give the most expeditious methods of extracting the square and cube roots; the reasons of which will readily appear from what is said under that article. As for all powers above the cube, unless such as are multiples of either the square and cube, the extraction of their roots admits of no deviation from the algebraic canon which must be always constructed on purpose for them.

If the root of any power not exceeding the seventh power, be a single digit, it may be obtained by inspection, from the following TABLE of powers.

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Extraction of Roots.

Extraction of Roots.

1 st power or root.	2 ^d power or square.	3 ^d power or cube.	4 th power or biquadrate.	5 th power or furfold.	6 th power or cube square.	7 th power.
1	1	1	1	1	1	1
2	4	8	16	32	64	128
3	9	27	81	243	729	2187
4	16	64	256	1024	4096	16384
5	25	125	625	3125	15625	78125
6	36	216	1296	7776	46656	279936
7	49	343	2401	16807	117649	823543
8	64	512	4096	32768	262144	2097152
9	81	729	6561	59049	531441	4782969

SECT. I. EXTRACTION of the SQUARE ROOT.

RULE I. " Divide the given number into periods of two figures, beginning at the right hand in integers, and pointing toward the left. But in decimals, begin at the place of hundreds, and point toward the right. Every period will give one figure in the root."

II. " Find by the table of powers, or by trial, the nearest lesser root of the left-hand period, place the figure so found in the quot, subtract its square from the said period, and to the remainder bring down the next period for a dividend or refolvend."

III. " Double the quot for the first part of the divisor; inquire how often this first part is contained in the whole refolvend, excluding the units place; and place the figure denoting the answer both in the quot and on the right of the first part; and you have the divisor complete."

IV. " Multiply the divisor thus completed by the figure put in the quot, subtract the product from the refolvend, and to the remainder bring down the following period for a new refolvend, and then proceed as before."

NOTE 1. If the first part of the divisor, with unity supposed to be annexed to it, happen to be greater than the refolvend, in this case place 0 in the quot, and also on the right of the partial divisor; to the refolvend bring down another period; and proceed to divide as before.

NOTE 2. If the product of the quotient-figure into the divisor happen to be greater than the refolvend, you must go back, and give a lesser figure to the quot.

NOTE 3. If, after every period of the given number is brought down, there happen at last to be a remainder, you may continue the operation, by annexing periods or pairs of cyphers, till there be no remainder, or till the decimal part of the quot repeat or circulate, or till you think proper to limit it.

Ex. 1st. Required the square root of 133225.

$$\begin{array}{r}
 \text{Square number } 133225 \text{ (365 root)} \\
 \underline{9} \\
 1 \text{ div. } 66) 432 \text{ refolvend.} \\
 \underline{396 \text{ product.}} \\
 1825 \\
 \underline{2190} \\
 1095
 \end{array}$$

2 div. 725) 3625 refolvend.
 3625 product. 133225 proof.
 2^d.] Required the square root of 72, to eight decimal places.

$$\begin{array}{r}
 72.00000000 \text{ (8.48528137 root.)} \\
 \underline{64} \\
 164)800 \\
 \underline{656}
 \end{array}$$

$$\begin{array}{r}
 1688)14400 \\
 \underline{13504}
 \end{array}$$

$$\begin{array}{r}
 16965)89600 \\
 \underline{84825}
 \end{array}$$

$$\begin{array}{r}
 169702)477500 \\
 \underline{339404}
 \end{array}$$

$$\begin{array}{r}
 169704)138096 \\
 \dots 135763
 \end{array}$$

$$\begin{array}{r}
 2333 \\
 \underline{1697}
 \end{array}$$

$$\begin{array}{r}
 636 \\
 \underline{509}
 \end{array}$$

$$\begin{array}{r}
 127 \\
 \underline{118}
 \end{array}$$

3^d.] Required the square root of .2916.

$$\begin{array}{r}
 .2916 \text{ (.54 root)} \\
 \underline{25} \\
 104) 416 \\
 \underline{416}
 \end{array}$$

If the square root of a vulgar fraction be required, find the root of the given numerator for a new numerator, and find the root of the given denominator for a new denominator. Thus, the square root of $\frac{3}{4}$ is $\frac{\sqrt{3}}{\sqrt{4}}$, and the root of $\frac{3}{4}$ is $\frac{1}{2}$; and thus the root of $\frac{3}{4}$ ($=6\frac{1}{2}$) is $\frac{1}{2}=2\frac{1}{2}$.

But if the root of either the numerator or denominator cannot be extracted without a remainder, reduce the vulgar fraction to a decimal, and then extract the root, as in Ex. 3^d. above.

SECT. II. EXTRACTION of the CUBE ROOT.

RULE I. " Divide the given number into periods of three figures, beginning at the right hand in integers, and pointing toward the left. But in decimals, begin at the place of thousands, and point toward the right. The number of periods shews the number of figures in the root."

II. " Find by the table of powers, or by trial, the nearest lesser root of the left-hand period; place the figure so found in the quot; subtract its cube from the said period; and to the remainder bring down the next period for a dividend or refolvend."

The divisor consists of three parts which may be found as follows.

4 R 2

III.

Extraction
of Roots.

III. "The first part of the divisor is found thus : Multiply the square of the quot by 3, and to the product annex two cyphers; then inquire how often this first part of the divisor is contained in the resolvend, and place the figure denoting the answer in the quot."

IV. "Multiply the former quot by 3, and the product by the figure now put in the quot; to this last product annex a cypher; and you have the second part of the divisor. Again, square the figure now put in the quot for the third part of the divisor; place these three parts under one another, as in addition; and their sum will be the divisor complete."

V. "Multiply the divisor, thus completed, by the figure last put in the quot, subtract the product from the resolvend, and to the remainder bring down the following period for a new resolvend, and then proceed as before."

Note 1. If the first part of the divisor happen to be equal to or greater than the resolvend, in this case, place 0 in the quot, annex two cyphers to the said first part of the divisor, to the resolvend bring down another period, and proceed to divide as before.

Note 2. If the product of the quotient-figure into the divisor happen to be greater than the resolvend, you must go back, and give a lesser figure to the quot.

Note 3. If, after every period of the given number is brought down, there happen at last to be a remainder, you may continue the operation by annexing periods of three cyphers till there be no remainder, or till you have as many decimal places in the root as you judge necessary.

Ex. 1.st. Required the cube root of 12812904.

$$\begin{array}{r}
 \text{Cube number } 12812904 \text{ (234 root)} \\
 \begin{array}{r}
 8 \\
 \hline
 1^{\text{st}} \text{ part } 1200 \quad \left. \begin{array}{l} 2^{\text{d}} \text{ part } 180 \\ 3^{\text{d}} \text{ part } 9 \end{array} \right\} 4812 \text{ resolvend.} \\
 \hline
 1 \text{ divisor } 1389 \times 3 = 4167 \text{ product} \\
 \hline
 1^{\text{st}} \text{ part } 158700 \quad \left. \begin{array}{l} 2^{\text{d}} \text{ part } 2760 \\ 3^{\text{d}} \text{ part } 16 \end{array} \right\} 645904 \text{ resolvend.} \\
 \hline
 2 \text{ divisor } 161476 \times 4 = 645904 \text{ product.}
 \end{array}
 \end{array}$$

P R O O F.

$$\begin{array}{r}
 234 \quad \text{Square } 54756 \\
 234 \quad \quad \quad 234 \\
 \hline
 936 \quad \quad \quad 219024 \\
 702 \quad \quad \quad 164268 \\
 468 \quad \quad \quad 109512 \\
 \hline
 \end{array}$$

$$\text{Square } 54756 \quad \text{Cube } 12812904$$

2^d.] Required the cube root of 28 $\frac{3}{4}$.

$$\begin{array}{r}
 28.750000 (3.06 \text{ root.} \\
 27 \quad \quad \quad \hline
 270000 \quad \left. \begin{array}{l} 5400 \\ 36 \end{array} \right\}) 1750000 \text{ resolv.} \\
 \hline
 \end{array}$$

$$\text{Div. } 275436 \times 6 = 1652616 \text{ prod.}$$

P R O O F.

$$\begin{array}{r}
 97384 \text{ rem.} \\
 \begin{array}{r}
 3.06 \quad \text{Sq. } 9.3636 \\
 3.06 \quad \quad \quad 3.06 \\
 \hline
 1836 \quad \quad \quad 561816 \\
 918 \quad \quad \quad 280908 \\
 \hline
 \text{Sq. } 9.3636 \quad \quad 28.652616 \\
 \quad \quad \quad \quad \quad 97384 \text{ rem.} \\
 \quad \quad \quad \quad \quad 28.750000 \text{ cube.}
 \end{array}
 \end{array}$$

If the cube root of a vulgar fraction be required, find the cube root of the given numerator for a new numerator, and the cube root of the given denominator for a new denominator. Thus, the cube root of $\frac{8}{27}$ is $\frac{2}{3}$, and the cube root of $\frac{27}{8}$ is $\frac{3}{2}$; and thus the cube root of $\frac{1}{8}$ is $\frac{1}{2}$ ($=15\frac{1}{4}$) is $\frac{1}{2}$.

But if the root of either the numerator or denominator cannot be extracted without a remainder, reduce the vulgar fraction to a decimal, and then extract the root.

A R I

**See Arians.* ARIUS, a divine of the fourth century, the head and founder of the Arians*, a sect which denied the eternal divinity and consubstantiality of the Word. He was born in Libya, near Egypt. Eusebius bishop of Nicomedia, a great favourite of Constantia sister of the emperor Constantine and wife of Licinius, became a zealous promoter of Arianism. He took Arius under his protection, and introduced him to Constantia; so that the sect increased, and several bishops embraced it openly. There arose, however, such disputes in the cities, that the emperor, in order to remedy these disorders, was obliged to assemble the council of Nice, where, in the year 325, the doctrine of Arius was condemned. Arius was banished by the emperor, all his books were ordered to be burnt, and capital punishment was denounced against whoever dared to keep them. After five years banishment, he was recalled to Constantinople, where he presented the emperor with

A R I

a confession of his faith, drawn up so artfully, that it fully satisfied him. Notwithstanding which, Athanasius, now advanced to the see of Alexandria, refused to admit him and his followers to communion. This so enraged them, that, by their interest at court, they procured that prelate to be deposed and banished. But the church of Alexandria still refusing to admit Arius into their communion, the emperor sent for him to Constantinople; where, upon delivering in a fresh confession of his faith in terms less offensive, the emperor commanded Alexander, the bishop of that church, to receive him the next day into his communion: but that very evening Arius died. The manner of his death was very extraordinary: as his friends were conducting him in triumph to the great church of Constantinople, Arius, pressed by a natural necessity, stepped aside to ease himself; but expired on the spot, his bowels gushing out.

But

But the heresy did not die with the heresiarch: his party continued still in great credit at court. Athanasius, indeed, was soon recalled from banishment, and as soon removed again; the Arians being countenanced by the government, and making and deposing bishops as it best served their purposes. In short, this sect continued with great lustre above 300 years: it was the reigning religion of Spain for above two centuries; it was on the throne both in the east and west; it prevailed in Italy, France, Pannonia, and Africa; and was not extirpated till about the end of the 8th century.

This heresy was again set on foot in the west by Servetus, who, in 1531, wrote a little treatise against the mystery of the Trinity. After his death, Arianism got footing in Geneva; from whence it removed into Poland; but, at length, degenerated, in a great measure, into Socinianism. Erasmus seems to have aimed at reviving Arianism, in his commentaries on the New Testament; and the learned Grotius seems to lean a little that way.

With regard to the state of Arianism in England, it may be sufficient to observe, that from the numerous publications of that sect which are daily making their appearance, it seems to be rather a growing, than exploded doctrine there.

Plate XL.
fig. 1.

ARK, or *Noah's Ark*, a floating vessel built by Noah for the preservation of his family and the several species of animals during the deluge.

The ark has afforded several points of curious inquiry among the critics and naturalists, relating to its form, capacity, materials, &c.

The wood whereof the ark was built is called in the Hebrew *Gopher-wood*, and in the Septuagint *square timbers*. Some translate the original cedar, others pine, others box, &c. Pelletier prefers cedar on account of its incorruptibility, and the great plenty of it in Asia, whence Herodotus and Theophrastus relate, that the kings of Egypt and Syria built whole fleets thereof, instead of deal.

The learned Mr Fuller, in his *Miscellanies*, has observed, that the wood whereof the ark was built was nothing but that which the Greeks call *καραγιάς*, or the *cyprus-tree*; for, taking away the termination, *kypar* and *gopher* differ very little in sound. This observation the great Bochart has confirmed, and shewn very plainly that no country abounds so much with this wood as that part of Assyria which lies about Babylon.

In what place Noah built and finished his ark is no less made a matter of dispute. But the most probable opinion is, that it was built in Chaldea, in the territories of Babylon, where there was so great a quantity of cypress in the groves and gardens in Alexander's time, that that prince built a whole fleet out of it for want of timber. And this conjecture is confirmed by the Chaldean tradition, which makes Xithurus (another name for Noah) set sail from that country.

The dimensions of the ark, as given by Moses, are 300 cubits in length, 50 in breadth, and 30 in height; which some have thought too scanty, considering the number of things it was to contain; and hence an argument has been drawn against the authority of the relation. To solve this difficulty many of the ancient fathers, and the modern critics, have been put to very miserable shifts: But Buteo and Kircher have proved

geometrically, that, taking the common cubit of a foot and a half, the ark was abundantly sufficient for all the animals supposed to be lodged in it. Snellius computes the ark to have been above half an acre in area. Father Lamy shews, that it was 110 feet longer than the church of St Mary at Paris, and 64 feet narrower: and if so, it must have been longer than St Paul's church in London, from west to east, and broader than that church is high in the inside, and 54 feet of our measure in height; and Dr Arbuthnot computes it to have been 81062 tons.

The things contained in it were, besides eight persons of Noah's family, one pair of every species of unclean animals, and seven pair of every species of clean animals, with provisions for them all during the whole year. The former appears, at first view, almost infinite; but if we come to a calculation, the number of species of animals will be found much less than is generally imagined, not amounting to an hundred species of quadrupeds, nor to two hundred of birds; out of which, in this case, are excepted such animals as can live in the water. Zoologists usually reckon but an hundred and seventy species in all; and bishop Wilkins shews that only 72 of the quadruped kind needed a place in the ark.

By the description Moses gives of the ark, it appears to have been divided into three stories, each ten cubits or 15 feet high; and it is agreed on, as most probable, that the lowest story was for the beasts, the middle for the food, and the upper for the birds, with Noah and his family; each story being subdivided into different apartments, stalls, &c. though Josephus, Philo, and other commentators, add a kind of fourth story under all the rest; being, as it were, the hold of the vessel, to contain the ballast and receive the filth and feces of so many animals: but F. Calmet thinks, that what is here reckoned a story, was no more than what is called the *keel* of ships, and served only for a conservatory of fresh water. Drexelius makes 300 apartments; F. Fournier, 333; the anonymous author of the Questions on Genesis, 400; Buteo, Temporius, Arias Montanus, Hofius, Wilkins, Lamy, and others, suppose as many partitions as there were different sorts of animals. Pelletier makes only 72, viz. 36 for the birds, and as many for the beasts. His reason is, that if we suppose a greater number, as 333 or 400, each of the eight persons in the ark must have had 37, 41, or 50 stalls to attend and cleanse daily, which he thinks impossible to have been done. But it is observed, that there is not much in this: to diminish the number of stalls without a diminution of animals is vain; it being perhaps more difficult to take care of 300 animals in 72 stalls, than in 300. As to the number of animals contained in the ark, Buteo computes that it could not be equal to 500 horses; he even reduces the whole to the dimensions of 56 pair of oxen. F. Lamy enlarges it to 64 pair of oxen, or 128 oxen; so that, supposing one ox equal to two horses, if the ark had room for 256 horses, there must have been room for all the animals. But the same author demonstrates, that one floor of it would suffice for 500 horses, allowing nine square feet to a horse.

As to the food in the second story, it is observed by Buteo from Columella, that 30 or 40 pounds of hay ordinarily suffices for an ox a-day; and that a solid

Ark
Arles.

lid cubit of hay, as usually pressed down in our hayricks, weighs about 40 pounds; so that a square cubit of hay is more than enough for one ox in one day. Now, it appears, that the second story contained 150,000 solid cubits; which divided between 206 oxen will afford each more hay, by two thirds, than he can eat in a year. Bishop Wilkins computes all the carnivorous animals equivalent, as to the bulk of their bodies, and their food, to 27 wolves; and all the rest to 280 bees. For the former, he allows 1825 sheep; and for the latter, 109,500 cubits of hay: all which will be easily contained in the two first stories, and a deal of room to spare. As to the third story, nobody doubts of its being sufficient for the fowls; with Noah, his sons, and daughters. Upon the whole, the learned bishop remarks, that of the two, it appears much more difficult to assign a number and bulk of necessary things to answer the capacity of the ark, than to find sufficient room for the several species of animals already known to have been there. This he attributes to the imperfection of our list of animals, especially those of the unknown parts of the earth; adding, that the most expert mathematician at this day could not assign the proportion of a vessel better accommodated to the purpose than is here done: and hence he finally concludes, that the capacity of the ark, which had been made an objection against scripture, ought to be esteemed a confirmation of its divine authority; since, in those ruder ages, men, being less versed in arts and philosophy, were more obnoxious to vulgar prejudices than now; so that, had it been an human invention, it would have been contrived according to those wild apprehensions which arise from a confused and general view of things as much too big as it had been represented too little.

But it must be observed, that, besides the places requisite for the beasts and birds, and their provisions, there was room required for Noah to lock up household utensils, the instruments of husbandry, grains and seeds to sow the earth with after the deluge; for which purpose it is thought that he might spare room in the third story for 36 cabins, besides a kitchen, a hall, four chambers, and a space about 48 cubits in length to walk in.

Plate XL.
fig. 2.

ARK of the covenant, a small chest or coffer, three feet nine inches in length, two feet three inches in breadth, and two feet three inches in height, in which were contained the golden pot that had manna, and Aaron's rod, and the tables of the covenant. This coffer was made of shittim-wood, and was covered with the mercy-seat, which was of solid gold; at the two ends whereof were two cherubims, looking toward each other, with expanded wings, which, embracing the whole circumference of the mercy-seat, met on each side in the middle. The whole, according to the Rabbins, was made out of the same mass, without joining any of the parts by solder. Here it was that the Schechinah or Divine Presence rested, both in the tabernacle and in the temple, and was visibly seen in the appearance of a cloud over it; and from hence the Divine oracles were given out by an audible voice, as often as God was consulted in the behalf of his people.

ARKLOW, a sea-port town of Ireland, in the county of Wicklow, and province of Leinster. W. Long. 6. 15. N. Lat. 52. 55.

ARLES, a city of Provence, in France, seated on

the east side of the Rhone, on a hill, whose declivity is towards the north. It is an archbishop's see; and is celebrated for its antiquities, both within and without the city. Those of which any remains are now to be seen are the amphitheatre, the obelisk, the Elyfian Fields, the sepulchres, columns with their capitals, busts, pedestals, aqueducts, with some remains of the capitol, and the temples of their gods. The other ancient monuments are entirely destroyed. Under the amphitheatre, in 1651, they found the statue of Venus, which was worshipped by this city; and has been since carried to the castle of Versailles. It is a master-piece which will always be admired by connoisseurs.

The amphitheatre is one of the most remarkable pieces of antiquity; it was built by the Romans, but the time is unknown, though some say by Julius Cæsar. It is of an oval form, and about four hundred yards in circumference, and the front is thirty-four yards in height. The middle, called the *Arena*, is a hundred and forty-two yards wide, and a hundred and four broad. The porticos or piazzas are three stories, built with stone of a prodigious fize. Each of them consists of sixty arches, which still remain; and the walls are of a surprising thickness, but gone to decay.

The obelisk is the only one of this kind to be seen in France. It seems to be one of the forty brought from Egypt to Rome, because it is of the same oriental granite with them. They are generally full of hieroglyphic characters; but this is quite smooth. In 1675, it was found in a private garden near the walls of the city, not far from the Rhone. It consists of one piece; and is fifty-two feet high, and seven in diameter at the base. It is now supported with four lions made of bronze; and on the top a blue ball is placed, with the arms of France, and over that a sun.

The Pagans burying-place, called the *Elyfian Fields*, is without the city, upon an agreeable hill, divided into two parts. The first, called *Moulaire*, has very few tombs, they having been broken to build the walls of gardens, which are made in that place. The second, called *Eliscamp*, contains a great number. Those of the Pagans have the letters D. M. which signifies *Dis Manibus*. Those of the Christians have a cross. Pieces of coin of gold, silver, and bronze, are found here; as also urns, lamps, and cups, without number.

Here is a royal academy of sciences, consisting of thirty members, who must be natives, gentlemen, and inhabitants of the city. It enjoys the same privileges as that at Paris. Arles is surrounded with marshy land, which renders the air full of vapours, and makes it not very wholesome. Long. 4. 48. E. Lat. 43. 40.

ARLEUX, an ancient town of the Netherlands, in Cambresis, with a castle. It was taken by the French in 1645, and retaken by the allies in 1711; but the French got possession again the same month. E. Long. 3. 16. N. Lat. 59. 17.

ARLON, an ancient town of the Netherlands, formerly a strong place, but now dismantled. It belongs to the house of Austria. E. Long. 15. 50. Lat. 49. 4.

ARM, a part of the human body, terminating at one end in the shoulder, and at the other in the hand *.

ARM, among sportsmen, is applied to a horse, when, by pressing down his head, he endeavours to defend himself against the bit, to prevent his being checked by it.

ARM, in geography, implies a branch of the sea, running

Arles
Arm.* See *Anatom.*
my, uo 48.
8cc.

*Fig. 1. NOAH'S ARK
floating on the waters of the Deluge*

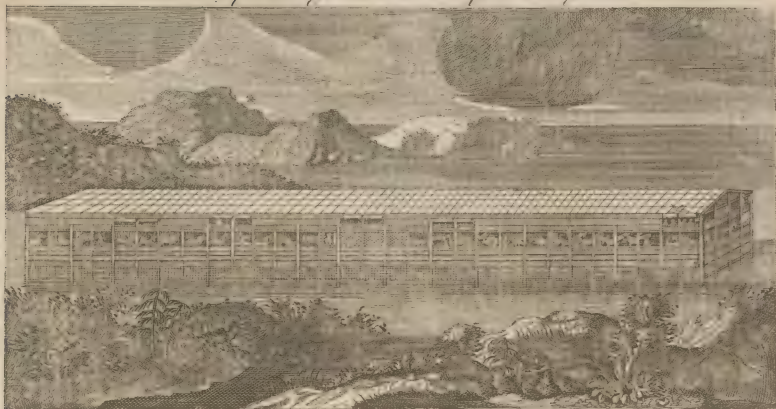
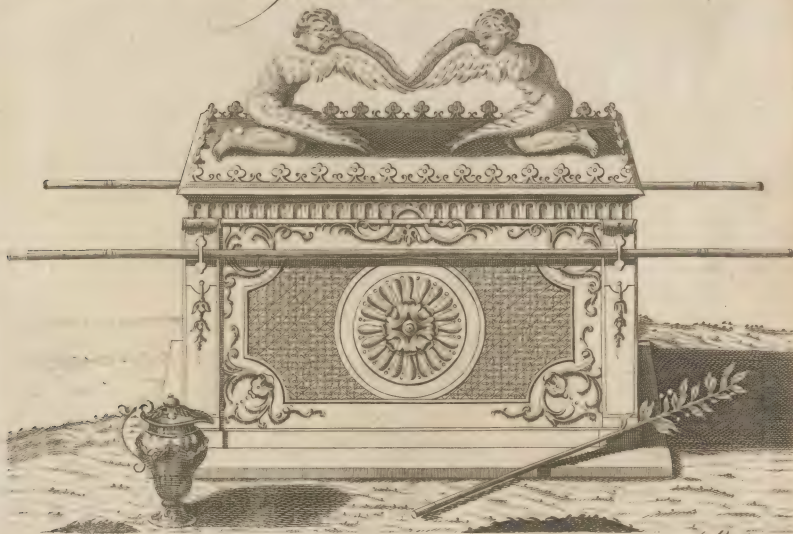
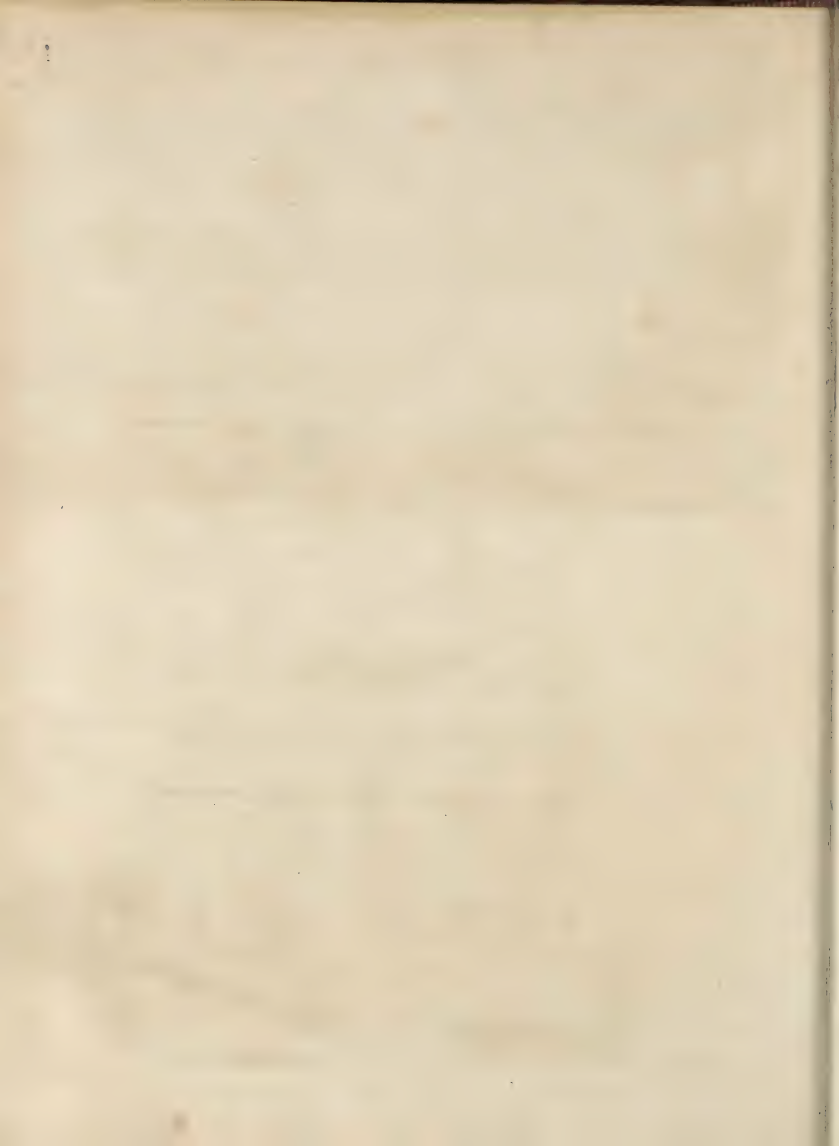


Fig. 2. ARK of the COVENANT



J. B. P.



Armescales

Armed.

running some distance into the land.

ARMACALES, a river of Babylon, (Abydenus); called *Rofia Regia*, the *Royal Trench*, or *Cut* (Polybius); the *Royal River*, (Ptolemy); *Almarbur*, (Pliny); *Naarmalcha*, (Ammian), a factitious channel, or cut, made by Nebuchadanofor, and a horn or branch of the Euphrates, (Abydenus). The Euphrates naturally divides into two channels, one passing through Babylon, the other through Seleucia, and then falls into the Tigris: the factitious channel between these two is the Royal River; which mixes with the Tigris, a great deal lower down than Seleucia, at Apamea, (Ptolemy).

ARMADA, a Spanish term, signifying a fleet of men of war, as *armadilla* does a squadron.—The armada, which attempted to invade England in the time of Queen Elizabeth, is famous in history.

ARMADILLO, in zoology, a synonyme of the *dasyfus*. See *DASYFUS*.

ARMAGH, a county of Ireland, bounded by Louth on the south; Lough-neagh, on the north; Tyrone and Monaghan, on the west; and Down, in part, on the east, from which it is separated by the river Newry. It is in length 32 miles, in breadth 17; and is divided into five baronies, containing about 170,620 acres. Both the air and soil are good, especially the latter, which is said to be the richest in Ireland; only there is a certain tract in it called the *Fewer*, that is, *hilly and barren*. The members it sends to parliament are six, *viz.* two for the city of Armagh, two for the county, and two for the borough of Charlemont.

Armagh, standing near the river Kalin, gives name to the county, and is the see of the primate of all Ireland. It is said to have been founded by St Patrick in the fifth century; and in 1142, it was constituted an archbishopric, together with Dublin, Cashel, and Tuam, by cardinal Papyreo, with the consent of the king, dukes, bishops, abbots, and states of Ireland. This Papyreo was sent into Ireland by Pope Eugenius, to reform the abuses that had crept into the church-discipline of that country. Here was anciently a famous monastery built by St Colombo, or Columbanus, about the year 610. This town was first subjected to the English by John de Courcy; but afterwards entirely destroyed by Tir Oen, or O'Neal, in Queen Elizabeth's time. However, it was afterwards recovered, rebuilt, and garrisoned by the English.

ARMAGNAC, a province of Guienne, in France, 55 miles in length, and 40 in breadth; bounded on the east by the river Garonne, on the south by Bigorre and Bearn, on the west by Gascony, and on the north by Condomois and Agenois: Auch is the capital town. It is fertile in corn and wine, and carries on a considerable trade in brandy, wool, and bon-chretien pears, which are excellent.

ARMED, in the sea-language. A cross-bar shot, is said to be armed, when some rope-yarn or the like is rolled about the end of the iron-bar, which runs through the shot.

ARMED, in heraldry, is used when the horns, feet, beak, or talons, of any beast or bird of prey, are of a different colour from the rest of their body.

ARMED-Ship, a vessel occasionally taken into the service of the government in time of war, and employed to guard more particular coast, or attend on a

fleet. She is therefore armed and equipped in all respects like a ship of war, and commanded by an officer of the navy, who has the rank of master and commander. All ships of this sort are upon the establishment of the king's fleets, having a lieutenant, master, purser, surgeon, &c.

ARMENE, or **ARMINA**, anciently a hamlet of Paphlagonia, (Ptolemy). The inhabitants encompassed it with a wall, because of the coldness of the place, imagining by that means to render it warmer. But this proving ineffectual, gave rise to the proverb *Armenus muro cingere*, used to express some egregious folly.

ARMENIA, a country of Asia, anciently divided into Armenia Major and Minor.—Armenia Major, according to Strabo, was bounded on the south by mount Taurus, which separated it from Mesopotamia; on the east, by the two Medias; on the north, by Iberia and Albania, or rather that part of mount Caucasus which surrounds them both; and on the west, by Armenia Minor, or the mountains Paryadres, some Pontic nations, and the Euphrates. The most considerable cities were Artaxata, Tigranocerta, and Theodosiopolis.—Armenia Minor was bounded on the east by the Euphrates; on the south, by mount Taurus, which separated it from Cilicia; on the west and north, by a long chain of mountains called in different places *Mons Scordiscus*, *Amanus*, and *Antitaurus*, by which it was separated from Cappadocia.

Whence this tract received the name of *Armenia* is not determined. The Greeks suppose it to be so called from one *Armenus*, who attended Jason in the Argonautic expedition, and afterwards settled in this country. Others, transforming Armenia into Aramia, derive its name from Aram the son of Shem, or from one of the kings of Armenia bearing that name. Bochart imagines it to be a contraction or compound of Aar, a Hebrew word signifying a *mountain*, and Mini signifying *metal*, and which was the name of a province of Armenia mentioned by the prophet Jeremiah.

Herodotus derives the ancient Armenians from the Phrygians, by reason that several Phrygian words were crept into the ancient Armenian language. But Strabo reckons them to have been originally Syrians, which Bochart looks upon to be the most probable opinion.

Armenia is said to have been very early advanced to the honour of a kingdom. Berosus makes one Sythia the first founder of this monarchy, whose successor Bardiaces, he says, was driven out by Ninus king of Assyria. Plutarch mentions one Araxes king of Armenia, who in a war with the Persians, being assured of success by an oracle, provided he sacrificed his two daughters, caused the two daughters of one Miesaleus, a nobleman of his court, to be sacrificed in their stead, flattering himself that he thereby complied with the oracle. But Miesaleus did not fail to revenge the death of his own daughters by putting the king's two daughters to death, and pursued himself so closely, that he was drowned in attempting to swim across the Araxes, which was then called *Helmsus*.

The Armenians were in process of time subdued by the Medes, to whom Astyages made them tributaries, but allowed them to be governed by their own kings; but on the dissolution of the Median empire by Cyrus, the kingdom was reduced to the form of a province, and they were governed by Persian prefects or lieutenants.

Armenie,
Armenia.

Armenia.

nants. On the destruction of the Persian empire by Alexander the Great, Armenia fell into the hands of the Macedonians; to whom it continued subject till the beginning of the reign of Antiochus the Great. This prince having appointed two prefects called *Zadriades* and *Artaxias* to govern Armenia, they excited the people to a revolt, and caused themselves to be proclaimed kings of the provinces over which they presided. Antiochus being then very young, they were attended with success beyond their expectation; which encouraged them to attempt the enlargement of their territories. Accordingly, invading the neighbouring countries, they took from the Medes the provinces of *Caspiana*, *Phaunitis*, and *Basoropida*; from the Iberians, *Chorzena* and *Gogorena* on the other side of the *Cyrrus*; from the *Chalybes* and *Mossynæci*, the provinces of *Parenta* and *Herexena*, which bordered on Armenia Minor.

On this occasion, the abovementioned division of the kingdom into Armenia Major and Minor first took place. *Artaxias* became king of Armenia Major, and *Zadriades* of Armenia Minor; and this distinction subsists even at this day.

By whom *Artaxias* was succeeded is not known; neither have we any account of the transactions of his reign, farther than that Antiochus led a powerful army against him and *Zadriades*, but without being able to recover a single province. Upon this, he concluded a peace, desirous to fall upon them at a proper opportunity; but they having entered into alliance with the Romans, by that means secured themselves in the possession of their kingdom. After this, *Artaxias* was defeated and taken prisoner by Antiochus *Epiphanes*; but, some how or other, seems to have been restored to his kingdom.

From this time we meet with a chasm in the Armenian history for 70 years; during which all we know is, that *Tigranes*, the king's son, was delivered up as an hostage to the Parthians; from whence it is plain, that the Armenians had been carrying on an unsuccessful war with that nation. On the news of his father's death, however, the Parthians set the young king at liberty, having first obliged him to give up a considerable part of his kingdom by way of ransom.

Tigranes, being thus restored to his father's kingdom, was prevailed upon in the beginning of his reign to enter into an alliance with *Mithridates Eupator* against the Romans, whose power began to give jealousy to all the princes of Asia. One of the articles of this treaty was, that *Mithridates* should have the cities and conquered countries, and *Tigranes* the captives and plunder. In consequence of this, *Tigranes* was to invade *Cappadocia*, which he had lately been obliged, by a decree of the senate of Rome, to give up to *Ariobarzanes*. But before either of the princes took the field, a marriage was solemnized with all possible magnificence between *Tigranes* and *Cleopatra* the daughter of *Mithridates*.

Immediately after the nuptials, *Tigranes* set out on his intended expedition; and *Ariobarzanes*, on the first news of his march, abandoned his kingdom and fled to Rome. Thus *Tigranes*, without fighting a stroke, enriched himself with the booty, and then proclaimed *Ariarathes*, *Mithridates*'s son, king of *Cappadocia*, to the universal satisfaction of the people.

Armenia.

In the mean time the Syrians, being harassed with a long and intestine war of the *Seleucids*, invited *Tigranes* to come and take possession of their country; which he accordingly did, and kept it for 18 years, till he was driven out by *Pompey*, and Syria reduced to the form of a Roman province. Encouraged by this success, he next invaded Armenia Minor; defeated and killed king *Artanes*, who opposed him with a considerable army; and in one campaign made himself master of the whole kingdom. From Armenia Minor he marched against the Asiatic Greeks, the *Adiabeniens*, the *Assyrians*, and the *Gordians*, carrying all before him, and obliging the people wherever he came to acknowledge him sovereign. From this second expedition he returned home loaded with booty, which he soon after increased by the spoils of *Cappadocia*, invading that kingdom a second time at the instance of *Mithridates*, who had been obliged by the Romans to withdraw his forces from thence. From *Cappadocia* *Tigranes*, besides other booty, brought back into Armenia no fewer than 300,000 captives, having surrounded the country with his numerous forces in such a manner that none could escape. These, together with the prisoners he had taken in his two first expeditions, he employed in building the city of *Tigranocerta*, which they afterwards peopled.

In the mean time *Mithridates*, who had concluded a peace with the Romans for no other end than to gain time, sent a solemn embassy to *Tigranes*, inviting him to enter into a second alliance against the common enemy. This he at first declined; but in the end was prevailed upon by his wife *Cleopatra* to send him considerable supplies, though he never came heartily into the war, not caring to provoke the Romans, who on their part kept fair with him, taking no notice for the present of the supplies he had sent *Mithridates*. That unfortunate prince, being soon after defeated by *Lucullus*, was forced to fly for shelter into Armenia, where he met with a very cold reception from his son-in-law, who would neither see him, treat with him, nor own him as his relation; however, he promised to protect his person, and allowed him in one of his castles a princely retinue, and a table suitable to his former condition.

Though this total overthrow of *Mithridates* might have opened the eyes of *Tigranes*, and made him oppose with all his might the growing power of the Romans, he foolishly left them to finish their conquest of *Pontus*, while he marched at the head of a very numerous army against the Parthians, with a design to recover from them the dominions they had formerly extorted from him before they set him at liberty. These he easily retook; and, not satisfied with what formerly belonged to him, he added to them all *Mesopotamia*, the countries that lay about *Ninus* and *Arbela*, and the fruitful province of *Migdonia*; the Parthians, tho' at that time a mighty people, dying every where before him. From *Mesopotamia* *Tigranes* marched into Syria to quell a rebellion which had been raised by *Cleopatra* surnamed *Selene*, who, after the death of her husband *Antiochus Pius*, reigned jointly with her sons in that part of Syria which *Tigranes* had not seized on. The malcontents were quickly reduced; and the queen herself was taken prisoner, and confined to the castle of *Seleucia*, where she was soon after put to death by the king's order. From Syria *Tigranes* passed into *Phœ-*
nice,

Armenia.

nice, which he subdued either entirely or in great part, spreading far and wide the terror of his arms, inasmuch that all the princes of Asia, except those who were in alliance with the Romans, either in person, or by their deputies, submitted and paid homage to the conqueror.

The king, having now subdued all Syria to the borders of Egypt, and being elated with a long course of victories and prosperous events, began to look upon himself as far above the level of other crowned heads. He assumed the title of *King of kings*, and had many kings waiting upon him as menial servants. He never appeared on horseback without the attendance of four kings dressed in livery, who run by his horse; and when he gave answers to the nations that applied to him, the ambassadors stood on either side the throne with their hands clasped together, that attitude being of all others then accounted among the orientals the greatest acknowledgment of vassalage and servitude. In the midst of all this haughtiness, however, he was unexpectedly visited by an ambassador from Lucullus the Roman general, who without any ceremony told him, that he was come to demand Mithridates king of Pontus, who had taken refuge in his dominions, and, in case of his refusal, to declare war against him. Notwithstanding his high opinion of himself, Tigranes returned a mild answer to this message: in which, however, he refused to deliver up his father-in-law; and being highly provoked at Lucullus for not giving him the title of *King of kings* in his letter, he did not so much as bestow upon him the title of *general*, in his answer. In the mean time, being informed that Zarbius king of the Gordians had entered into a private alliance with the Romans, he put him, his wife, and children, to death; and then, returning into Armenia, received with the greatest pomp imaginable his father-in-law Mithridates, whom to that time he had not admitted into his presence, though he had resided a year and eight months in his dominions. They had several private conferences; and at last Mithridates was sent back to Pontus with 10,000 horse, to raise there what disturbances he could.

Lucullus, on the other hand, hearing the king's resolution to protect Mithridates, immediately began his march for Armenia, at the head of only two legions of foot and 3000 horse, having left 6000 men in Pontus to keep that country quiet. Having passed the Euphrates without opposition, he detached two parties; one to besiege a city where he heard that Tigranes's treasure and concubines were kept; and the other under Sextilius, to block up Tigranocerta, in order to draw the king to a battle. But Tigranes, after having put to death the scout that brought him the first intelligence of the approach of the Romans, made towards Mount Taurus, which he had appointed for the place of the general rendezvous. The Roman general then dispatched Murena in pursuit of the king; who having overtaken him in a narrow pass, defeated him, and, besides all the baggage, carried off a great many prisoners, the king himself having fled in the beginning of the skirmish. After this, he sent out several parties to scour the country, in order to prevent the innumerable forces of Tigranes from joining into one body. This, however, he was not able to effect: Tigranes was joined by such numbers of Gordians, Medes, A-

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diabeniens, Albanians, Iberians, &c. that, before he left Mount Taurus, his army consisted, according to Plutarch, of 150,000 foot armed cap-a-pee, 35,000 pioneers, 20,000 archers and slingers, and 55,000 horse.

Lucullus was so far from being dismayed at this formidable army, that the only fear he had was lest the king should follow the advice of Mithridates, which was not to engage the Romans, but, by ravaging the country, distress them for want of provisions. In order to draw him to a battle, therefore, he formed the siege of Tigranocerta, imagining that Tigranes would never suffer that fine city to be taken without making any attempt to relieve it. The event fully answered his expectations: Tigranes having called a council of war, it was unanimously resolved to attack the Romans; and Taxiles, whom Mithridates sent to dissuade the king from venturing a battle, was in danger of losing his head on account of the advice he gave. The Roman general, finding Tigranes disposed to come to an engagement, left Murena with 6000 men to carry on the siege, while he himself marched against the king's vast army with only 10,000 men, according to some, and the highest computations make them no more than 18,000. The Romans were at first greatly disheartened; but being encouraged by Lucullus, they immediately broke the Armenian army, who betook themselves to flight almost at the first onset. The Romans pursued them till night, making a most terrible slaughter. Plutarch informs us, that of the Armenians 100,000 foot were killed, and that very few of the cavalry escaped; whereas the Romans only five men were killed, and 100 wounded. Antiochus the philosopher, mentioning this battle, says, that the sun never beheld the like; and Livy, that the Romans never fought at such a disadvantage; the conquerors not amounting to a twentieth part of the conquered. Tigranes in his flight having met with his son in as forlorn a condition as himself, resigned to him his royal robes and diadem, desiring him to shift for himself and save those royal ensigns. The young prince delivered them to a trusty friend, who, being taken by the Romans, consigned them to Lucullus.

While the king was making his escape after this terrible overthrow, he was met by Mithridates, who was marching to his assistance at the head of a considerable army. The king of Pontus cheered up his son-in-law as well as he could, and encouraged him to continue the war; advising him, instead of fruitlessly bewailing the present disaster, to rally his troops, raise new supplies, and renew the war, not questioning but that in another campaign he might repair all the losses he had sustained: but while the two kings were consulting upon these matters, Lucullus made himself master of Tigranocerta. From this city he marched into the small kingdom of Gordyene, where he celebrated, with the utmost pomp, the obsequies of king Zarbius, whom Tigranes had put to death, lighting the funeral pile with his own hands. In this kingdom, besides immense sums of gold and silver, he met with such store of provisions as enabled him to carry on the war without putting the republic to any charge.

The two kings, having levied new forces, appointed their troops to rendezvous in the spacious plains on the other side of Mount Taurus; whereupon Lucullus, leav-

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ving Gordyene, and passing by Mount Taurus, encamped close by the enemy. Several skirmishes happened for some time between the two armies without any considerable advantage; but Lucullus could by no means draw them to a general engagement. Upon this, he decamped, as if he designed to march to Artaxata and lay siege to that place, where Tigranes had left his wife and children, with great part of his treasures. He had scarce formed his camp when the enemy appeared, and sat down close by him. Lucullus did not allow them to fortify their camp, but immediately attacked them, and having put them to flight after a faint resistance, pursued them all night with great slaughter, took most of the chief officers prisoners, and returned the next day loaded with booty.

The Roman soldiers now, finding the cold very severe, though it was no later in the year than the autumnal equinox, requested their general to allow them to retire into winter-quarters. This request he rejected with indignation; upon which they mutinied. Lucullus did all he could to persuade them to continue in their duty, and prevailed so far that they consented to lay siege to Nisibis in hopes of booty. This place they took; and Lucullus, to the great satisfaction of his troops, took up his winter-quarters there. The next year, however, his forces again mutinied, accusing him of amassing immense wealth for himself, and throwing their empty purses at his feet, told him, that as he enriched himself alone, he might carry on the war by himself. He endeavoured to appease them as much as possible; but the sedition being fomented by a party who favoured Pompey the great, at that time aspiring to the command of Lucullus' army, the latter found himself obliged to fit still and see Mithridates and Tigranes over-run Cappadocia, and recover all Armenia and great part of Pontus. They would have gained much greater advantages, had not a son of Tigranes taken arms against his father, and obliged him to divide his troops. The father and son coming to a pitched battle, the latter was defeated, and forced to save himself in Parthia, where he persuaded Phrahates, king of that country, to assist him with a numerous army against his father. Phrahates having laid siege to Artaxata, Tigranes the elder was obliged to hide himself in the mountainous parts of his kingdom; upon which the king of Parthia returned home. Of this Tigranes the father being apprised, he immediately abandoned the fastnesses of the mountains; and, falling upon his son at Artaxata, dispersed the rebels with great slaughter, and entered his metropolis in triumph. Tigranes the son fled first to Mithridates; but finding him reduced to great straits, having been overcome a few days before, with the loss of 40,000 men, by Pompey, he went over to the Romans, and led them into Armenia against his father as an ally of Mithridates.

Tigranes, being now quite dispirited, and unable to make head against the Romans, resolved at once to submit. Accordingly he waited on Pompey in his camp, and having delivered his sword to two lictors, prostrated himself before him, and laid his diadem at his feet. Pompey, however, gave him a gracious reception, restored him the kingdom of Armenia, but fined him of 6000 talents for making war on the Roman people without cause. As the king had appealed to the Roman general for justice against his son, Pom-

pey heard both parties the next day, and made the son governor of Gordyene and Sophene; but the treasures that were kept in the latter he adjudged to the father, because without them he could not pay the fine. The son, being thus disappointed, endeavoured first to make his escape, and afterwards, by private messengers, solicited the inhabitants not to deliver up the treasures to his father. This being taken very much amiss by Pompey, he caused him to be kept in irons; and even then he found means to stir up Phrahates, king of Parthia, whose daughter he had married, against the Romans, and to form a conspiracy against his father's life; whereupon Pompey sent him in chains to Rome, where he was kept prisoner in the house of L. Flavius a senator, till the tribuneship of P. Clodius, who, being bribed with a large sum of money, set him at liberty in spite of Pompey and the senate.

Tigranes being now thoroughly humbled, willingly yielded to the Romans Cappadocia, Syria, Cilicia, and that part of Phœnicæ which he possessed, contenting himself with his paternal kingdom; and not only paid the fine laid upon him, but made large presents to Pompey, and all the officers of his army, which procured him the title of *the friend and ally of the Roman people*. He afterwards entered into a war with Phrahates king of Parthia, by whom he was overcome, and would have been driven out of his kingdom, had not a peace been brought about by the mediation of Pompey. He ever after cultivated a strict friendship with the Romans; inasmuch that he not only refused to receive Mithridates, who fled to him after he had been routed by Pompey near Mount Stella, but even offered a reward of 100 talents to any one that would put him to death. His second son also, by name Sauraster, took up arms against him; but, by the assistance of the Romans, that rebellion was soon quelled. He died in the 85th year of his age; and was succeeded by his son Artavasdes, called by Josephus *Artabazus*, by Orosius *Artabazus*, and by others *Artabazites*.

From this time to the time of Trajan Armenia was governed by its own kings; but as they were plainly vassals to the Romans, though they did not take that title till the reign of the emperor Nero, their history falls to be considered under that of the Romans.

By Trajan the kingdom of Armenia Major was reduced to the form of a Roman province; but it soon recovered its liberty, and was again governed by its own kings in the reigns of Constantine the Great, and his successor, to whom the kings of Armenia were feudatories. In the reign of Justin II. the Saracens subdued and held it till the irruption of the Turks, who possessed themselves of this kingdom, and gave it the name of *Turcomania*. The Turks, after the reduction of Armenia, invaded Persia, and other countries subject to the emperors of the east; which gave the Armenians an opportunity of shaking off the Turkish yoke, and setting up kings of their own, by whom they were governed till the country was again subdued by Occadam, or, as some style him, *Hocata*, the son of Cingis, and first cham of the Tartars. Neither was the conquest of Armenia by the Tartars so absolute as to extirpate the race of their kings; seeing we read of Haithon, surnamed the *Armenian*, reigning some time after, and going in person to treat with Mongo, the great cham of Tartary, of the concerns of his kingdom;

dom; and in our chronicles we find mention made of Leo king of Armenia, who, in the reign of Richard II. came into England to sue for aid against the Turks, by whom he had been driven from his kingdom. In the year 1472 of the Christian æra, Ussan Cassanes king of Armenia succeeding to the crown of Persia, made Armenia a province of that empire; in which state it continued till the year 1522, when it was subdued by Selim II. and made a province of the Turkish empire. Some say, that Selim I. reduced it on his return from Persia, where he had gained a complete victory over the great Sophi Ismael. But Sanfovian assures us, that in the reign of Selim I. who died in 1520, both the Lesser and Greater Armenia had their own kings; and adds, that Selim caused the head of the king of the Lesser Armenia to be cut off and sent to Venice, as a mark of his victory. We read no where else of any kings of Armenia after it became a province of Persia. Be that as it will, the Turkish annals cited by Calvius inform us, that Selim II. conquered Armenia in 1522, since which time it has ever continued subject to the Turks, except the eastern part, which the Persians are masters of to this day.

Concerning Armenia Minor we find very little recorded, except what has been already mentioned, and what falls under the Roman history. It was made a Roman province by Vespasian, continued so till the division of the empire, when it was subjected to the emperors of the east; and, on the decline of their power, was subdued first by the Persians, and afterwards by the Turks, who gave it the name of *Genech*, and have kept it ever since.

This country is still divided into the Great and Small. Great Armenia comprehends what is now called *Turcomania*. It has Georgia on the north, from which it is separated by high mountains; the river Euphrates on the west; Diarbeker, Curdistan, and Aderbikan, on the south; and Shirvan on the east. The chief towns in that part of Armenia belonging to Turkey are, Arzum the capital, near the springs of the Euphrates, a large city, and a great thoroughfare for the caravans between Turkey and Persia; Kara, a strong city, head of the government of the same name; Bayazid, a republic of Hurds, near mount Ararat; Baha, another republic of the same; and Van or Wan, on the lake Van, the head of a government of the same name; with other towns of less note. That part of Armenia subjected to Persia is chiefly contained in the province of Aran, in which are several fine towns; as, Erivan or Rivan, the capital of the whole; Ganjals, one of the finest cities in Persia, in the north of the province, near the Kur; Kapan, on the south side, near the Aras; besides Nakchivan; Attabad Julfa, Orabad, Baylakan or Pilkkan, on the Aras; Berdah and Shilkah on the Kur.

The country in general is full of mountains and valleys, lakes, and rivers; particularly the country about the three churches, near Erivan, is admirably fine, being full of rivulets, which render it extremely fruitful. Besides great quantities of all sorts of grain, here are fields of a prodigious extent covered with tobacco; but it is not a native of the place, though supposed by some to be the terrestrial paradise; for it all came originally from America. The rest of the country produces rice, cotton, flax, melons, and grapes: in short,

there is nothing wanting but olives; which is by some thought to prove that the ark could not rest on mount Ararat, because the dove brought an olive-branch in her mouth, and this tree never leaves a place where it once grew. It seems, however, to have been otherwise anciently; for Strabo tells us, that the olive grew in Gogarene, a province of Armenia. They get oil to burn from the ricinus, and use linseed-oil in the kitchen. The water-melons are as cool as ice in the hottest day, and melt in the mouth; the best are produced in the salt-lands, near the three churches and the river Aras. After rain, the sea-salt lies in crystals upon the fields, and even crackles under the feet. About ten miles from the three churches, in the road to Teflis, there are pits or quarries of fossile salt, which yield enough to supply all Persia, without being exhausted; they cut it into large pieces like stone, and each buffalo carries two of them; the mountain from whence it is dug is nothing but a mass of salt, which appears like a rock of silver, when the sun shines, on the places not covered with earth.

This country has been remarkable for its extreme cold from the remotest antiquity: Sir John Chardin tells us, that he found ice in the rivulets in the mornings even of the month of July. In many places, also, if they had not the convenience of watering their grounds, they would be almost entirely barren.

The Armenians are an honest, civil, polite people, scarce troubling themselves about any thing else but trade, which they carry on in most parts of the world, by which means they have spread themselves over the east, and also great part of Europe; and wherever they come, commerce is carried on with spirit and advantage.

The religion of the Armenians is the Christian, of the Eutychnian sect: that is, they own but one nature in Jesus Christ; and when they speak of the hypostatical union, that he is perfect God and perfect man without mixture. They have a high esteem for a book they call the *Little Gospel*, which treats of the infancy of Jesus, and says that the Virgin Mary being pregnant, her sister Salome accused her of having prostituted herself; to which the Virgin answered, that she needed only to lay her hand on her belly, and the world know how she came to be with child: this Salome accordingly did, and fire came out of her belly, which consumed the half her arm; upon which she acknowledged her fault, and drew it back: after which it was healed by putting it to the flame place.

The Armenian clergy consist of patriarchs, archbishops, doctors, secular priests, and monks. The secular priests are not allowed to marry a second time; and therefore they take care to chuse young healthy wives: they maintain themselves and families by following some occupation, inasmuch that they have hardly time to perform their ecclesiastical functions: they lie in the churches on the vigils of those days they are obliged to officiate.

The Armenians monks are of the order of St Basil; and every Wednesday and Friday they eat neither fish, nor eggs, nor oil, nor any thing made of milk, and during Lent they live upon nothing but roots: they are allowed wine only on the Saturday in the Holy Week, and meat on the Easter Sunday. Besides the great Lent, they have four others of eight days each,

Armenia
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Armenus.

which are instituted to prepare for the four great festivals of the Nativity, the Ascension, the Annunciation, and of St George; in which times they must not lo much as speak of eggs, fish, oil, or butter.

The Armenians have seven sacraments; baptism, confirmation, penance, the eucharist, extreme unction, orders, and matrimony. In baptism, the child is plunged three times into the water, and the same form of words that is used with it is repeated every time; the priest then puts a small cord made with silk and cotton on the neck of the infant, and anoints his forehead, chin, stomach, arm-pits, hands, and feet, making the sign of the cross on each part. When the child is baptized, he is carried home by the godfather with the sound of drums and trumpets. The women do not go to church till forty days after their delivery; and they observe many Jewish customs.

At the communion, to which infants of two or three months old are admitted, the priests give a piece of the consecrated host, soaked in the consecrated wine. The elements are covered with a great veil, and placed in a cup-board near the altar, on the side of the gospels. When the priest takes the chalice and patten, he is followed by his deacons, and subdeacons, with flambeaux and plates of copper furnished with bells: in this manner, with a censer before him, he goes in procession round the sanctuary; he then sets them on the altar, pronounces the words of consecration, and turns himself to the people, who fall down, kiss the earth, and beat their breasts: then, after taking it himself, he distributes the host soaked in wine to the people.

The Armenians seem to place the chief part of their religion in fastings and abstinences: and among the clergy, the higher the degree, the lower they must live; inasmuch that it is said the archbishops live on nothing but pulse. They consecrate holy water but once a year, at which time every one fills a pot and carries it home, which brings in a considerable revenue to the church.

ARMENIACA. See PRUNUS.

ARMENIAN, something belonging to or produced in Armenia: thus we say, *Armenian bole*, *Armenian stone*, &c. See BOLE, and ARMENUS LAPIS.

ARMENTIERS, a small handsome town of the Netherlands, in the county of Flanders, and district of Ypres. It was taken by Lewis XIV. in 1667, who dismantled it; and it now belongs to the French. It is seated on the river Lis. E. Long. 3. 3. N. Lat. 50. 40.

ARMENUS LAPIS, *Armenian stone*, in natural history, a mineral substance, which is but improperly called a *stone*; being no other than an ochreous earth, and properly called *blue ochre*. It is a very valuable substance in painting, being a bright and lively blue. It was in so high esteem as a paint among the ancients, that counterfeits were continually attempted to serve in its place. Theophrastus has recorded it as a thing judged worthy a place in the Egyptian annals, which of their kings had the honour of inventing the fictitious kind; and he tells us the genuine native substance was a thing of that value, that presents were made of it to great persons, and that the Phœnicians paid their tribute in it.—It is a very beautiful earth, of an even and regular texture; and of a fine blue, sometimes deeper, sometimes paler, and frequently mixed with green. It is

Amiers
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Arminius.

soft, tender, and light; of an even, but somewhat dusky, surface; it adheres firmly to the tongue, and is dry, but not harsh to the touch. It easily breaks between the fingers, and does not stain the hands. It is of a brackish disagreeable taste, and does not ferment with acids. It is a very scarce fossil; but is found very pure, though in but small quantities, in the mines at Gosslauer in Saxony. It is frequently found spotted with green, and sometimes with black; and very often is mixed among the green ochre, called *berggruen* by the Germans, which has thence been erroneously called by its name. See further the article BICE.

AMIERS, a town of Hainault, in the French Netherlands, seated on the river Samber. E. Lon. 3. 45. N. Lat. 50. 15.

ARMIGER, a title of dignity, belonging to such gentlemen as bear arms: and these are either by courtesy, as sons of noblemen, eldest sons of knights, &c.; or by creation, such as the king's servants, &c. See ESQUIRE.

ARMILLARY, in a general sense, something consisting of rings or circles.

ARMILLARY Sphere, an artificial sphere composed of a number of circles of the mundane sphere, put together in their natural order, to ease and assist the imagination in conceiving the constitution of the heavens, and the motions of the celestial bodies. The armillary sphere revolves upon its axis within a silvered horizon, which is divided into degrees, and moveable every way upon a brass supporter. The other parts are the equinoctial, zodiac, meridian, the two tropics, and the two polar circles. See GEOGRAPHY.

ARMILUSTRIUM, in Roman antiquity, a feast held among the Romans, in which they sacrificed armed, to the sound of trumpets.

ARMINIANS, a religious sect, or party, which arose in Holland, by a separation from the Calvinists. They followed the doctrine of Arminius, (see the next Article); who, thinking the doctrine of Calvin, with regard to free-will, predestination, and grace, too severe, returned to that of the Romish church, and maintained, that there is an universal grace given to all men, and that man is always free and at liberty to receive or reject grace. His colleague Gomarus, professor of divinity in the same university, strenuously opposed him; and stood up for a particular or special grace given only to those who were predestinated or elected, and for a positive decree both of election and reprobation. At length the dispute was brought before the synod of Dort, where Arminianism was condemned in form. Nevertheless it continued to spread, and the republic of Holland was once in danger of being overturned by it.

The Arminians are likewise called *Remonstrants*, from a remonstrance which they presented to the States-General in 1611, in which were laid down the chief articles of their faith.

The later Arminians have carried things much farther than Arminius himself, and some of them even come very near to Socinianism. In general, they deny, that authority is any proof of the truth of a doctrine; and, on this principle, they retrench abundance of things which have been looked upon as fundamental articles of religion. Many of them have quitted the doctrine of their master relating to the points of eternal election.

Arminius
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Armio.

tion and reprobation: for Episcopius lays it down, that God elects no person from all eternity, but only at the time when he is actually a believer. They speak very ambiguously of the preience of God, which was the principal strong hold of Arminius. They look on the doctrine of the Trinity as a point not necessary to salvation; and they generally avoid the term *satisfac-tion of Christ*. They contend for a general toleration of all those who profess the Christian religion.

ARMINIUS (James), whose real name in Low Dutch was James Harmanni, a famous Protestant divine, from whom the modern sect of Arminians * take their name, was born at Oude-water, in Holland, in 1560. He was ordained minister at Amsterdam, on the 11th of Augult, 1588; when he soon distinguished himself by his sermons, which were remarkable for their solidity and learning, and gained him universal applause: but Martin Lydias, professor of divinity at Franker, judging him a fit person to refute a writing in which Beza's doctrine of predestination had been attacked by some ministers of Delft, Arminius at his intreaties undertook the task; but upon thoroughly examining the reasons on both sides, he came into the opinions he proposed to destroy, and afterwards went still farther than the ministers of Delft had done. In 1600, he opposed those who maintained that ministers should subscribe the confession and catechism every year. In 1602, a pestilential disease raged at Amsterdam, during which he acted with the greatest resolution and courage, in assisting the poor, and comforting the sick; and Lucas Trelocatus and Francis Junius dying of that disease at Leyden, the curators of that university chose Arminius professor of divinity there, and he was afterwards made doctor of divinity. Disputes upon grace were soon after kindled in that university; and he was at length engaged in a new contest, occasioned by a disputation of his concerning the divinity of the Son. These contests, his continual labour, and the concern of seeing his reputation blasted by a multitude of slanders in relation to his opinions, impaired his health, and threw him into a fit of sickness, of which he died on the 19th of October, 1609.

Arminius was esteemed an excellent preacher: his voice was low, but very agreeable; and his pronunciation admirable: he was easy and affable to persons of all ranks, and facetious in his conversation amongst his friends. His great desire was, that Christians should bear with one another in all controversies which did not affect the fundamentals of their religion; and when they persecuted each other for points of indifference, it gave him the utmost dissatisfaction. The curators of the university of Leyden had so great a regard for him, that they settled a pension upon his wife and children.

He left several works, viz. 1. Disputationes de diversis Christiane religionis capitibus. 2. Orationes, itemque tractatus insigniores aliquot. 3. Examen modesti libelli Gulielmi Perkinfii de predestinationis modo et ordine, itemque de amplitudine gratiæ diviniæ. 4. Analysis capituli noni ad Romanos. 5. Dissertatio de vero et genuino sensu capituli septimi epistolæ ad Romanos. 6. Amica collatio cum D. Francisco Junio de predestinatione per literas habita. 7. Epistola ad Hippolytum a collibus.

ARMIRO, atown of Macedonia, in European Tur-

ky, feated on the Gulph de Velo. E. Long. 23. 40. N. Lat. 38. 34.

ARMISTICE, in military affairs, a temporary truce or cessation of arms for a very short space of time. The word is Latin, *armistitium*; and compounded of *arma*, arms, and *sto*, to stand, or stop.

ARMOISIN, a silk stuff, or kind of taffety, manufactured in the East Indies, at Lyons in France, and at Lucca in Italy. That of the Indies is slighter than those made in Europe.

ARMONIAE See AMMONIAC.

ARMORIAL, something relating to arms or coats of arms. See ARMS.

ARMORIC, or AREMORIC, something that belongs to the province of Bretagne, or Brittany, in France. The name *Armorica* was anciently given to all the northern and western coast of Gaul, from the Pyreneans to the Rhine; under which name it was known even in Cæsar's time. The word is of Bas Breton origin, and denotes as much as *maritime*; compounded, according to M. Menage, of *ar*, upon, and *more*, sea.

ARMORIST, a person skilled in the knowledge of armory.

ARMORY, a warehouse of arms, or a place where the military habiliments are kept to be ready for use.

ARMORY is also a branch of the science of heraldry, consisting in the knowledge of coats of arms, as to their blazons and various intendments. See HERALDRY.

ARMOUR denotes such habiliments as serve to defend the body from wounds, especially of darts, a sword, a lance, &c. A complete suit of armour formerly consisted of a helmet, a shield, a cuirasse, a coat of mail, a gauntlet, &c. all now laid aside.

ARMOURER, a person who makes or deals in arms and armour.

ARMOZA, or HARMOZIA, a town in Carmania, at the mouth of the Anamis, which falls into the Persian Gulf, (Arrian); *Armusa*, (Ptolemy); and from this the neighbouring island, and a small kingdom, take the modern name of *Ormuz*. E. Long. 56. 17. N. Lat. 27. 20.

ARMS, in a general sense, all kinds of weapons, whether offensive or defensive.

ARMS, in a legal sense, extend to any thing a person wears for his own defence, or takes in his hand, and uses in anger, to strike or throw at another.

ARMS, or *Armories*, in heraldry, signify marks of honour borne upon shields, banners, and coats, in order to distinguish kingdoms, states, families, and persons *.

Charged ARMS are such as retain their ancient integrity, with the addition of some new honourable bearing. * See Heraldry, chap. 11.

Canting or Vocal ARMS, those in which there are some figures alluding to the name of the family.

Full or Entire ARMS, such as retain their primitive purity, without any alterations or abatements.

False ARMS, such as are not conformable to the rules of heraldry.

ARMS, in falconry, imply the legs of a hawk from the thigh to the foot.

ARMUYDEN, a sea-port town of the United Provinces, in the island of Walcherin, formerly very flourishing; but now inconsiderable, the sea having stooped up the harbour. The salt-works are its chief resource. E. Long. 3. 40. N. Lat. 51. 30.

ARMY,

Armidee
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Armeyden.

* See the preceding article.

Army,
Arnal.

ARMY, a large number of soldiers, consisting of horse and foot, completely armed, and provided with artillery, ammunition, provisions, &c. under the command of one general, having lieutenant-generals, major-generals, brigadiers, and other officers, under him. An army is composed of squadrons and battalions; and is usually divided into three corps, and formed into three lines: the first line is called the *vanguard*, the second the *main-body*, and the third the *rear-guard* or *body of reserve*. The middle of each line is possessed by the foot; the cavalry form the right and left wing of each line; and sometimes they place squadrons of horse in the intervals between the battalions. When the army is drawn up in order of battle, the horse are placed at five feet distance from each other, and the foot at three. In each line the battalions are distant from each other 180 feet, which is nearly equal to the extent of their front; and the same holds of the squadrons, which are about 300 feet distant, the extent of their own front. These intervals are left for the squadrons and battalions of the second line to range themselves against the intervals of the first, that both may more readily march through these spaces to the enemy: the first line is usually 300 feet distant from the second, and the second from the third, that there may be sufficient room to rally when the squadrons and battalions are broken *.

* See *Heath-
ticle War*.

This is to be understood of a land-army only. A naval or sea-army is a number of ships of war, equipped and manned with sailors and mariners, under the command of an admiral, with other inferior officers under him. See *Naval Tactics*.

Long experience has shewn, that in Europe a prince with a million of subjects cannot keep an army of above 10,000 men, without ruining himself. It was otherwise in the ancient republics: the proportion of soldiers to the rest of the people, which is now as about 1 to 100, might then be as about 1 to 8. The reason seems owing to that equal partition of lands which the ancient founders of commonwealths made among their subjects; so that every man had a considerable property to defend, and means to defend it with: whereas, among us, the lands and riches of a nation being shared among a few, the rest have no way of subsisting but by trades, arts, and the like; and have neither any free property to defend, nor means to enable them to go to war in defence of it, without starving their families. A large part of our people are either artisans or servants, and so only minister to the luxury and effeminacy of the great. While the equality of lands subsisted, Rome, though only a little state, being refused the succours which the Latins were obliged to furnish after the taking of the city in the consulate of Camillus, presently raised ten legions within its own walls; which was more, Livy assures us, than they were able to do in his time, tho' matters of the greatest part of the world. A full proof, adds the historian, that we are not grown stronger; and that what swells our city is only luxury, and the means and effects of it.

ARNALL (William), a noted political writer in defence of Sir Robert Walpole, was originally an attorney's clerk; but being recommended to Walpole, he employed him for a course of years in writing the *Free Briton* and other papers in defence of his administration. By the report of the secret committee, he appears to have received, in the space of four years, no

less than 10,000*l.* 6*s.* 8*d.* out of the treasury for his writings! but spending his money as fast as it came, and his supplies stopping on Sir Robert's resignation, he died broken-hearted and in debt, in the 26th year of his age. His invention was so quick, that his honourable employer used to say, no man in England could write a pamphlet in so little time as Arnall.

ARNAUD DE MEYREVILLE, or MESEVIL, a poet of Provence, who lived at the beginning of the 13th century. He wrote a book intitled *Las rescalfas de sa comtesse*; and a collection of poems and sonnets. He died in the year 1220. Petrarch mentions him in his *Triumph of Love*.

ARNAUD DE VILLA NOVA, a famous physician, who lived about the end of the 13th and beginning of the 14th century. He studied at Paris and Montpellier, and travelled through Italy and Spain. He was well acquainted with languages, and particularly with the Greek, Hebrew, and Arabic. He was at great pains to gratify his ardent desire after knowledge; but this passion carried him rather too far in his researches: he endeavoured to discover future events by astrology, imagining this science to be infallible; and upon this foundation he published a prediction, that the world would come to an end in the middle of the 14th century. He practised physic at Paris for some time: but having advanced some new doctrines, he drew upon himself the resentment of the university; and his friends, fearing he might be arrested, persuaded him to retire from that city. Upon his leaving France, he retired to Sicily, where he was received by king Frederic of Arragon with the greatest marks of kindness and esteem. Some time afterwards, this prince sent him to France, to attend pope Clement in an illness; and he was shipwrecked on the coast of Genoa, about the year 1313. The works of Arnau, with his life prefixed, were printed in one volume, in folio, at Lyons, in 1520; and at Basil in 1585, with the notes of Nicholas Tolerus.

ARNAUD d'ANDILLY (Robert), the son of a celebrated advocate of the parliament of Paris, was born in 1588; and, being introduced young at court, was employed in many considerable offices, all which he discharged with great integrity and reputation. In 1644, he quitted business, and retired into the convent of Port Royal des Champs, where he passed the remainder of his days in a continued application to works of piety and devotion; and enriched the French language with many excellent translations of different writers, as well as with religious compositions of his own. He died in 1674, and his works are printed in 8 vols. folio.

ARNAUD (Anthony), brother of the preceding, and a doctor of the Sorbonne, was born in 1612. He published, in 1643, *A Treatise on frequent Communion*, which highly displeased the Jesuits; and the disputes upon grace, which broke out about this time in the university of Paris, and in which he took a zealous part with the Jesuits, helped to increase the animosity between him and the Jesuits. But nothing raised so great a clamour against him, as the two letters he wrote on *Abolition*; in the second of which the faculty of divinity found two propositions which they condemned, and M. Arnau was expelled the society. Upon this he retired; and during a retreat which lasted near 25 years, he composed that great variety of works which are extant of his, on grammar, geometry, logic, metaphysics,

Arnaud.

Arnay
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Arnica.

Arnica
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Arnobius.

taphysics, and theology. In 1679, he withdrew from France, living in obscurity in the Netherlands, and died in 1694. His heart, at his own request, was sent to be deposited in the Port Royal. Arnaud had a remarkable strength of genius, memory, and command of his pen, nor did these decay even to the last year of his life. Mr Bayle says, he had been told by persons who had been admitted into his familiar conversation, that he was a man very simple in his manners; and that unless any one proposed some question to him, or desired some information, he said nothing that was beyond common conversation, or that might make one take him for a man of great abilities; but when he set himself to give an answer to such as proposed a point of learning, he seemed as it were transformed into another man: he would then deliver a multitude of fine things with great perspicuity and learning, and had a particular talent at making himself intelligible to persons of not the greatest penetration.

ARNAY-LE-DUC, a town of France, in the duchy of Burgundy, which carries on a pretty good trade. It is seated on the Auxois, in a valley near the river Aroux. E. Long. 4. 26. N. Lat. 47. 7.

ARNDT (John), a famous protestant divine of Germany, born at Ballenstädt, in the duchy of Anhalt, in the year 1555. At first he applied himself to the study of physic: but falling into a dangerous sickness, he made a vow to change his profession for that of divinity, if he should be restored to health; which he accordingly did, upon his recovery. He was minister first at Quedlinburg, and then at Brunswick. He met with great opposition in this last city: his success as a preacher raised the enmity of his brethren, who became his bitter enemies. In order to ruin his character, they ascribed a variety of errors to him; and persecuted him to such a degree, that he was obliged to leave Brunswick, and retire to Ilse, where he was minister for three years. In 1611, George duke of Lunenburg, who had a high opinion of his integrity and sanctity, gave him the church of Zell, and appointed him superintendant of all the churches in the duchy of Lunenburg; which office he discharged for 11 years, and died in 1621. It is reported that he foretold his death, having said to his wife, upon his return home after his last sermon, that now he had preached his funeral sermon. He wrote in High Dutch A Treatise on true Christianity, which has been translated into several languages.

ARNHEIM, a town of the Low Countries, in the province of Guelderland, capital of Veluwe. It was adorned with several fine churches, particularly that of St Walburg and of St Eusebius; which last has a very high tower. The town has five gates, and several fine ramparts, part of which are washed by the Rhine, and the other parts have wide and deep ditches before them. There is a canal made between this place and Nimwegen, at the expence of both towns, on which boats pass backwards and forwards to carry on a trade between them. The air is very healthful; on which account it is inhabited by persons of distinction. E. Long. 5. 55. N. Lat. 52. 0.

ARNICA, LEOPARDS BANE, in botany, a genus of the polygamia superflua order, belonging to the syngenesia class of plants.

Species. There are seven species of arnica, all of

which are natives of Ethiopia, except the two following: 1. The montana, with oval leaves, grows naturally on the Alps, and also upon many of the high mountains in Germany, and other cold parts of Europe. The roots of this species, when planted in a proper soil and situation, spread very far under the surface, and put out many entire oval leaves, from between which the flower-stems arise, which grow about a foot and an half high. The top is terminated by a single yellow flower, composed of many florets, like those of the dandelion. These are succeeded by oblong seeds, which are covered with down. 2. The scorpioides, with sawed leaves growing alternately, is a native of Bohemia and Siberia. The roots of this sort are much jointed, and divide into many irregular fleshy off-sets, which are variously contorted; from whence some superstitious persons have imagined, that they would expel the poison of scorpions, and cure the wounds made by the sting of that animal.

Culture. The first species delights in a moist shady situation: it may be propagated by parting the roots in autumn when the stalks begin to decay; or by the seeds sown in autumn soon after they are ripe, for those sown in the spring often fail. The second sort is to be propagated in the same manner. Both are very hardy, and require no other care than to be kept free from weeds.

Medicinal Uses. The leaves and roots of the first species were formerly esteemed a specific in resolving coagulated blood, for which purpose they are still prescribed in Germany where they grow; but their violent operation has made them fall into disuse in this country.

ARNISEUS (Henningus), a philosopher and physician of great reputation, about the beginning of the 17th century. He was born at Halbertad in Germany, and was professor of physic in the university of Helmstädt. His political works are much esteemed. The most remarkable of them is his book *De auctoritate principum in populum semper invariabili*, printed at Francfort in 1612. In this he maintains that the authority of princes ought not to be violated. He wrote also upon the same doctrine his three books *De jure majestatis*, printed at the same place in 1610; and his *Reflectiones politicae*, printed at Francfort in 1615. Having received an invitation to go to Denmark, he went thither, and was made counsellor and physician to the king. He travelled into France and England, and died in November 1635. Besides the pieces already mentioned, he wrote several philosophical, medicinal, and political treatises.

ARNOBIUS, professor of rhetoric at Sicca, in Numidia, towards the end of the third century. It was owing to certain dreams which he had, that he became desirous of embracing Christianity. For this purpose he applied to the bishops, to be admitted into the church. But they, remembering the violence with which he had always opposed the true faith, had some distrust of him; and, before they would admit him, insisted on some proofs of his sincerity. In compliance with this demand, he wrote against the Gentiles; wherein he has refuted the absurdities of their religion, and ridiculed their false gods. In this treatise he has employed all the flowers of rhetoric, and displayed great learning: but from an impatience to be admitted into the body of the faithful, he is thought to have been in too great a hurry in composing his work, and thence it is that there

Arnobius,
Arnold.

there does not appear in this piece such an exact order and disposition as could be wished; and not having a perfect and exact knowledge of the Christian faith, he published some very dangerous errors. Mr Bayle remarks, that his notions about the origin of the soul, and the cause of natural evil, and several other important points, are highly pernicious. St Jerom, in his epistle to Paulinus, is of opinion that his style is unequal and too diffuse, and that his book is written without any method; but Dr Cave thinks this judgment too severe, and that Arnobius wants neither elegance nor order in his composition. Vossius styles him *the Varro of the ecclesiastical writers*. Du Pin observes that his work is written in a manner worthy of a professor of rhetoric: the turn of his sentiments is very oratorical; but his style is a little African, his expressions being harsh and inelegant. We have several editions of this work of Arnobius against the Gentiles, one published at Rome in 1542, at Basil in 1546 and 1560, at Paris in 1570, at Atwerp in 1582, and one at Hamburg in 1610, with notes by Gebhard Elmenhorstius, besides many others. He wrote also a piece intitled *De rhetorica institutione*; but this is not extant.

ARNOLD, of Brescia, in Italy, distinguished himself by being the founder of a sect, which opposed the wealth and power of the Romish clergy. He went into France, where he studied under the celebrated Peter Abelard. Upon his return to Italy, he put on the habit of a monk, and maintained in his sermons, That the pope and the clergy ought not to enjoy any temporal estate; and that those ecclesiastics who had any estates of their own, or held any lands, were entirely cut off from the least hopes of salvation: that the clergy ought to subsist upon the alms and voluntary contributions of Christians; and that all other revenues belonged to princes and states, in order to be disposed of amongst the laity, as they thought proper. He maintained also several heresies with regard to baptism and the Lord's supper. St Bernard has drawn his character in very strong colours. "Would to God (says he) that his doctrine was as holy as his life is strict: would you know what sort of man this is? Arnold of Brescia is a man that neither eats nor drinks; who, like the devil, is hungry and thirsty after the blood of souls; who goes to and fro upon the earth, and is always doing among strangers what he cannot do amongst his own countrymen; who ranges like a roaring lion, always seeking whom he may devour; an enemy to the cross of Christ, an author of discords, an inventor of schisms, and a disturber of the public peace: he is a man, whose conversation has nothing but sweetness, and his doctrine nothing but poison in it; a man who has the head of a dove, and the tail of a scorpion." He engaged a great number of persons in his party, who were distinguished by his name, and proved very formidable to the popes. His doctrines rendered him so obnoxious, that he was condemned in the year 1139, in a council of near 1000 prelates, held in the church of St John Lateran at Rome, under Pope Innocent II. Upon this he left Italy, and retired to Switzerland. After the death of that pope, he returned to Italy, and went to Rome, where he raised a sedition against Pope Eugenius III. and afterwards against Hadrian IV. who laid the people of Rome under an interdict till they had banished Arnold and his followers. This had

its desired effect: the Romans seized upon the houses which the Arnoldists had fortified, and obliged them to retire to Otricoli in Tuscany; where they were received with the utmost affection by the people, who considered Arnold as a prophet. However, he was seized some time after by cardinal Gerard; and notwithstanding the efforts of the viscounts of Campanja, who had rescued him, he was carried to Rome, and condemned by Peter, the prefect of that city, to be hanged, and was accordingly executed in the year 1155. Thirty of his followers went from France to England, about the year 1160, in order to propagate their doctrine there; but they were immediately seized and destroyed.

ARNOLDISTS, in church-history, a sect so called from their leader Arnold of Brescia. See the preceding article.

ARNOLDUS (Gothofredus), pastor and inspector of the churches of Perleberg, and historiographer to the king of Prussia, was born at Annaburg in the mountains of Misnia, in 1666. He was a zealous defender of Pietists, a sect among the German Protestants, and composed a great number of religious works; particularly an *Ecclesiastical History*, which exposed him to the resentment of the divines; and another giving an account of the doctrines and manners from the first ages, in which he frequently animadverts upon Cave's primitive Christianity. He died in 1714. Various are the opinions concerning Arnoldus in Germany; some of his own countrymen and profession extolling him to the skies as a saint of the last century, and setting an inestimable value upon his works; while others pronounce damnation upon him as an arch-heretic, and condemn his writings as heterodox.

ARNOT', in botany, the English name of the bunium. See BUNIAM.

ARNOTTO. The same with ANNOTTO; which see. ARNSTADE, a town of Germany, in Thuringia, on the river Gera. E. Long. 11. 3. N. Lat. 50. 54.

ARNULPH, or ERNULPH, bishop of Rochester in the reign of Henry I. He was born in France, where he was some time a monk of St Lucian de Beauvais. The monks led most irregular lives in this monastery; for which reason he resolved to quit it, but first took the advice of Lanfranc archbishop of Canterbury, under whom he had studied in the abbey of Bec, when Lanfranc was prior of that monastery. This prelate invited him over to England, and placed him in the monastery of Canterbury, where he lived a private monk till Lanfranc's death. When Anselm came to the archiepiscopal see, Arnulph was made prior of the monastery of Canterbury, and afterwards abbot of Peterborough. In 1115, he was consecrated bishop of Rochester, which fee he held 9 years, and died in March 1124, aged 84.

Arnulph wrote, 1. A piece in Latin concerning the foundation, endowment, charters, laws, and other things relating to the church of Rochester: it is generally known by the title of *Textus Roffensis*, and is preserved in the archives of the cathedral church of Rochester. 2. An Epistle in Answer to some Questions of Lambert, abbot of Munster; and, 3. An Epistle on incestuous Marriage.

ARNUS, now *Arno*, a very rapid river of Tuscany, which it divides, and in its course washes

Arnoldists
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ARNUS.

France

Arway
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Aroua.

rence and Pifa; rising in the Apennine, to the east of Florence, near a village called *S. Maria delle Grazie*, on the borders of Romagna, 15 miles to the west of the sources of the Tiber; and then turning southward towards Arretium, it is there increased by the lakes of the Clanis; after which it runs westward, dividing Florence into two parts, and at length walking Pifa, falls eight miles below it into the Tuscan Sea.

ARNWAY (John), a clergyman distinguished by his benevolence and loyalty to King Charles I. was descended from a very good family in the county of Salop, from which he inherited a considerable estate. He was educated at Oxford; and, having received holy orders, obtained the rectories of Hodnet and Ightfield, where he distinguished himself by his piety and exemplary charity: for it was his custom to clothe annually 12 poor people, and every Sunday to entertain as many at his table, not only plentifully, but with intimacy and respect. The civil war breaking out, he preached against rebellion, and raised and clothed eight troopers for the service of King Charles I. upon which his house was plundered by the parliament's army. He then went to Oxford to serve the king in person, which subjected him to a new train of misfortunes: for his estate was soon after sequestered, and himself imprisoned till the king's death; after which, he went to the Hague, where he published, 1. *The Tablet*, or the Moderation of Charles I. the Martyr; and, 2. *An Alarm to the subjects of England*. He at last went to Virginia, where he died in 1653.

AROLEO, an American weight, equal to 25 of our pounds.

AROMA PHILOSOPHORUM, denotes either saffron, or the aroph of Paracelsus; as *aroma germanicum* denotes clecampa. See *AROPH*.

AROMATA, a town of Lydia, famous for its generous wines; and hence the appellation, (Strabo). Also the name of a trading town, and promontory of Ethiopia, at the termination of the Sinus Avalites of the Red Sea, (Arrian).

AROMATIC, an appellation given to such plants as yield a brisk fragrant smell, and a warm taste; as all kinds of spices, &c. See *MAT. MED.* n° 49, &c.

ARONA, a town of Italy, in the duchy of Milan, with a strong castle. It stands on the lake Maggiore. E. Long. 8. 25. N. Lat. 45. 41.

ARONCHES, a town of Portugal, in Alentejo, on the confines of Spain, seated on the river Caro. It is well fortified, and has about 500 inhabitants. W. Long. 5. 16. N. Lat. 39.

AROL, a town of the empire of Russia, in the Ukraïn, seated on the river Occa. E. Long. 38. 15. N. Lat. 51. 48.

AROPH, a contraction of *aroma philosophorum*; a name given to saffron.

AROPH Paracelsi; a name given to a kind of chemical flowers, probably of the same nature with the Ens Veneris, elegantly prepared by sublimation from equal quantities of lapis hæmatis and sal ammoniac.

AROPH is also a term used frequently by Paracelsus in a sense synonymous with *lithontripctic*.

AROSBAY, a town of the East Indies, on the coast of the island of Madura, near Java. E. Long. 14. 30. N. Lat. 9. 30.

AROURA, a Grecian measure of 50 feet. It was

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Arpagius
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Arragon.

more frequently used for a square-measure of half the plethron. The Egyptian aroua was the square of 100 feet.

ARPAGIUS, or HARPAGIUS, among the ancients, a person who died in the cradle, at least in early youth. The word is formed from the Greek *αργαῖος*, *I snatch*.—The Romans made no funerals for their *arpagii*. They neither burnt their bodies, nor made tombs, monuments, or epitaphs for them; which occasioned Juvenal to say,

—Terra clauditur infans
Et minor igne rogi.

In after times it became the custom to burn such as had lived to the age of 40 days, and had cut any teeth; and these they called *'αργαῖοι*, or *'αργαῖμοι*, q. d. *rapti, ravished*. The usage seems to have been borrowed from the Greeks; among whom, Eustathius assures us, it was the custom never to bury their children either by night or full day, but at the first appearance of the morning; and that they did not call their departure by the name of *death*, but by a softer appellation, *'βίαιος αργαῖος*, importing that they were ravished by Aurora, or taken away to her embraces.

ARPENT, signifies an acre or furlong of ground; and, according to the old French account in domedday-book, 100 perches make an arpent. The most ordinary acre, called *l'arpent de France*, is 100 perches square: but some account it but half an acre.

ARPINAS, or ARPINO, (Joseph Cæsar), a famous painter, born in the year 1560, at the castle of Arpinas, in the kingdom of Naples. He lived in great intimacy with Pope Clement VIII. who conferred upon him the honour of knighthood, and bestowed on him many other marks of his friendship. In the year 1600, he went to Paris with cardinal Aldobrandin, who was sent legate to the French court on the marriage of Henry IV. with Mary of Medicis. His Christian majesty gave Arpinas many considerable presents, and created him a knight of St Michael. The colouring of this painter is thought to be cold and inanimate; yet there is spirit in his designs, and his compositions have somewhat of fire and elevation. The touches of his pencil being free and bold, give therefore pleasure to connoisseurs in painting; but they are generally incorrect. What he painted of the Roman history is the most esteemed of all his works. The French king has in his collection the following pieces of this master, viz. the nativity of our Saviour, Diana and Actæon, the rape of Europa, and a Susanna. He died at Rome in 1640.

ARPINUM, a town of the Volsci, a little to the east of the confluence of the rivers Liris and Fibrenus, in the Terra di Lavoro; now decayed, and called *Arpino*. It was the native place of Cicero, and of C. Marius, (Sallust).

ARQUA, a town of Italy, in the Paduan, and territory of Venice, remarkable for the tomb of Petrarck. E. Long. 11. 43. N. Lat. 45. 43.

ARQUEBUS. See *HARQUEBUS*.

ARQUES, a town of Normandy, in France, seated on a small river of the same name. E. Long. 1. 30. N. Lat. 49. 54.

ARRACHEE, in heraldry, a term applied to the representations of plants torn up by the roots.

ARRACK. See *ARACK*.

ARRAGON. See *ARAGON*.

4 T

AR-

Arraign-
ment.

ARRAIGNMENT, in law, the arraiguing or setting a thing in order, as a person is said to arraign a writ of novel disseisin, who prepares and fits it for trial.

ARRAIGNMENT is most properly used to call a person to answer in form of law upon an indictment, &c.

When brought to the bar, the criminal is called upon by name to hold up his hand: which, though it may seem a trifling circumstance, yet is of this importance, that by the holding up of his hand *constat de persona*, and he owns himself to be of that name by which he is called. However, it is not an indispensable ceremony; for, being calculated merely for the purpose of identifying the person, any other acknowledgement will answer the purpose as well: therefore, if the prisoner obstinately and contemptuously refuses to hold up his hand, but confesses he is the person named, it is fully sufficient.

Then the indictment is to be read to him distinctly in the English tongue (which was law, even while all other proceedings were in Latin), that he may fully understand his charge. After which it is to be demanded of him, whether he be guilty of the crime whereof he stands indicted, or not guilty.

When a criminal is arraigned, he either stands mute, or confesses the fact; or else he pleads to the indictment.

1. If he says nothing, the court ought *ex officio* to impanel a jury to inquire whether he stands obstinately mute, or whether he be dumb *ex visitatione Dei*. If the latter appears to be the case, the judges of the court (who are to be counsel for the prisoner, and to see that he hath law and justice) shall proceed to the trial, and examine all points as if he had pleaded not guilty. But whether judgment of death can be given against such a prisoner, who hath never pleaded, and can say nothing in arrest of judgment, is a point yet undetermined.

If he be found to be obstinately mute (which a prisoner hath been held to be, that hath cut his own tongue), then, if it be on an indictment of high treason, it hath long been clearly settled, that standing mute is equivalent to a conviction, and he shall receive the same judgment and execution.

The English judgment of penance for standing mute was as follows: That the prisoner be remanded to the prison from whence he came; and put into a low, dark chamber; and there be laid on his back, on the bare floor, naked, unless where decency forbids; that there be placed upon his body as great a weight of iron as he could bear, and more; that he have no sustenance, save only, on the first day, three morsels of the worst bread; and, on the second day, three draughts of standing water, that should be nearest to the prison-door; and in this situation this should be alternately his daily diet, *till he died*, or, as anciently the judgment ran, *till he answered*.

It hath been doubted whether this punishment subsisted at the common law, or was introduced in consequence of the statute Westm. 1. 3 Edw. I. c. 12. which seems to be the better opinion. For not a word of it is mentioned in Glanvil or Bracton, or in any ancient author, case, or record (that hath yet been produced), previous to the reign of Edward I: but there are instances on record in the reign of Henry III. where

Arraign-
ment, Arran.

persons accused of felony, and standing mute, were tried in a particular manner, by two successive juries, and convicted; and it is asserted by the judges in 8 Henry IV. that, by the common law before the statute, standing mute on an appeal amounted to a conviction of the felony. This statute of Edward I. directs such persons, "as will not put themselves upon inquests of felonies before the judges at the suit of the king, to be put into hard and strong prison" (*Joient mys en la prison fort et dure*), as those which "refuse to be at the common law of the land." And, immediately after this statute, the form of the judgment appears in Fleta and Britton to have been only a very strict confinement in prison, with hardly any degree of fullenance; but no weight is directed to be laid upon the body, so as to hasten the death of the miserable sufferer: and indeed any surcharge of punishment on persons adjudged to penance, so as to shorten their lives, is reckoned by Horne in the Mirror as a species of criminal homicide. It also clearly appears, by a record of 31 Edw. III. that the prisoner might then possibly subsist for 40 days under this lingering punishment. It is therefore imagined that the practice of loading him with weights, or, as it is usually called, *pressing him to death*, was gradually introduced between 31 Edward III. and 8 Henry IV. at which last period it first appears upon the books; being intended as a species of mercy to the delinquent, by delivering him the sooner from his torment: and hence it is also probable, that the duration of the penance was then first altered; and instead of continuing *till he answered*, it was directly to continue *till he died*, which must very soon happen under an enormous pressure.

The uncertainty of its original, the doubts that were conceived of its legality, and the repugnance of its theory (for it rarely was carried into practice) to the humanity of the laws of England, all concurred to require a legislative abolition of this cruel process, and a restitution of the ancient common law; whereby the standing mute in felony, as well as in treason and in trespass, amounted to a confession of the charge.

2. If the prisoner made a simple and plain confession, the court hath nothing to do but to award judgment: but it is usually very backward in receiving and recording such confession, out of tenderness to the life of the subject; and will generally advise the prisoner to retract it, and

3. Plead to the indictment; as to which, see the article PLEA of Indictment.

ARRAN, an island of Scotland, in the Frith of Clyde, between Kintyre and Cunningham. Of this island the best description we have is that given by Mr Pennant, in his Tour through Scotland, Vol. II. 172—184, which we shall therefore transcribe.

"Arran, or properly *Arr-inn*, or the island of mountains, seems not to have been noticed by the ancients, notwithstanding it must have been known to the Romans, whose navy, from the time of Agricola, had its station in the *Glota Ffluarium*, or the Frith of Clyde: Camden indeed makes this island the Glota of Antonine, but no such name occurs in his itinerary; it therefore was bestowed on Arran by some of his commentators.

"By the immense cairns, the vast monumental stones, and many reliques of druidism, this island must have been an ancient times.

Arran prob-
ably fa-
mous in an-
cient times.

Arran.

been considerable in very ancient times. Here are still traditions of the hero Fingal, or Fin-mac-cool, who is supposed here to have enjoyed the pleasures of the chase; and many places retain his name: but I can discover nothing but oral history that relates to the island, till the time of Magnus the barefooted, the Norwegian victor, who probably included Arran in his conquests of Kintyre. If he did not conquer that island, it was certainly included among those that Donald-bane was to cede; for it appears that Acho, one of the successors of Magnus, in 1263, laid claim to Arran, Bute, and the Cumrays, in consequence of that promise: the two first he subdued, but the defeat he met with at Largs soon obliged him to give up his conquests.

"Arran was the property of the crown. Robert Bruce retired thither during his distresses, and met with protection from his faithful vassals: numbers of them followed his fortunes; and after the battle of Bannockburn he rewarded several, such as the Mac-cooks, Mac-kinnons, Mac-brides, and Mac-louis, or Fullertons, with different charters of lands in their native country. All these are now absorbed by this great family, except the Fullertons, and a Stewart, descended from a son of Robert III. who gave him a settlement here. In the time of the Dean of the Isles, his descendant possessed cattle Douan; and *he and his bluid*, says the dean, *are the best men in that country*.

"About the year 1334, this island appears to have formed part of the estate of Robert Stewart, great steward of Scotland, afterwards Robert II. At that time they took arms to support the cause of their master; who afterwards, in reward, not only granted at their request an immunity from their annual tribute of corn, but added several new privileges, and a donative to all the inhabitants that were present.

"In 1456, the whole island was ravaged by Donald earl of Ross and lord of the isles. At that period, it was still the property of James II. but in the reign of his successor James III. when that monarch matched his sister to Thomas lord Boyd, he created him earl of Arran, and gave him the island as a portion: soon after, on the disgrace of that family, he caused the countess to be divorced from her unfortunate husband; and bestowed both the lady and island on Sir James Hamilton, in whose family it continues to this time, a very few farms excepted.

"Arran is of great extent, being 23 miles from Sgreadan point north to Beinnean south; and the number of inhabitants are about 7000, who chiefly inhabit the coasts; the far greater part of the country being uninhabited by reason of the vast and barren mountains. Here are only two parishes, Kilbride and Killmore; with a sort of chapel of ease to each, founded in the last century, in the golden age of this island, when it was blessed with Anne Dutchess of Hamilton, whose amiable disposition and humane attention to the welfare of Arran render at this distant time her memory dear to every inhabitant.

"The principal mountains of Arran are, Goat-field, or Gaoilbheinn, or the mountain of the winds, of a height equal to most of the Scottish Alps, composed of immense piles of moor-stone, in form of wool-packs, clothed only with lichens and mosses, inhabited by eagles and ptarmigans; Bein-bharrain, or the sharp-pointed; Ceum-na-caillich, the step of the carline

or old hag; and Grianan-Athol, that yields to none in ruggedness.

"The lakes are Loch-jorfa, where salmon come to spawn; Lochtaua; Loch-nah-jura, on the top of a high hill; Loch-mhachrai, and Loch-knoc a char-bell, full of large eels. The chief rivers are Abhan-mhor, Moira-mhor, Slondrai-machrei, and Jorfa; the two last remarkable for the abundance of salmon.

"The quadrupeds are very few; only otters, wild cats, shrew-mice, rabbits, and bats: the fags, which used to abound, are now reduced to about a dozen. The birds are eagles, hooded crows, wild pigeons, storks, black game, grouse, ptarmigans, daws, green plovers, and curlews. Mr Stuart, in ascending Goat-field, found the secondary feather of an eagle, white, with a brown spot at the base, which seemed to belong to some unknown species. It may be remarked, that the partridge at present inhabits this island, a proof of the advancement of agriculture.

"The climate is very severe; for besides the violence of wind, the cold is very rigorous; and snow lay here in the valleys for 13 weeks of the last winter. In summer, the air is remarkably salubrious; and many invalids resort here on that account, and to drink the whey of goats milk.

"The principal disease here is the pleurisy: small-pox, measles, and chin-cough, visit the island once in seven or eight years. The practice of bleeding twice every year seems to have been intended as a preventative against the pleurisy: but it is now performed with the utmost regularity at spring and fall. The duke of Hamilton keeps a furgeon in pay; who, at those seasons, makes a tour of the island. On notice of his approach, the inhabitants of each farm assemble in the open air; extend their arms; and are bled into a hole made in the ground, the common receptacle of the vital fluid.

"In burning fevers, a tea of *wood-forrel* is used with success, to allay the heat.

"An infusion of *ramsons*, or *allium ursinum*, brandy is esteemed here a good remedy for the gravel.

"The men are strong, tall, and well made; all speak the Erse language, but the ancient habit is entirely laid aside. Their diet is chiefly potatoes and meal; and during winter, some dried mutton or goat is added to their hard fare. A deep dejection appears in general thro' the countenances of all: no time can be spared for amusement of any kind; the whole being given for procuring the means of paying their rent, of laying in their fuel, or getting a scanty pittance of meat and clothing.

"The leases of farms are 19 years. The succeeding tenants generally find the ground a little better than a *caput mortuum*: and for this reason; Should they at the expiration of the lease leave the lands in a good state, some avaritious neighbours would have the preference in the next setting, by offering a price more than the person who had expended part of his subsistence in enriching the farm could possibly do. This induces them to leave it in the original state.

"The method of setting a farm is very singular: each is commonly possessed by a number of small tenants; thus a farm of 40*l*. a-year is occupied by 18 different people, who by their leases are bound, conjunctly and severally, for the payment of the rent to the proprie-

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Lakes, &c.

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tor. These live in the farm in houses clustered together, so that each farm appears like a little village. The tenants annually divide the arable land by lot; each has his ridge of land, to which he puts his mark, such as he would do to any writing: and this species of farm is called *run-rig*, i. e. ridge. They join in ploughing; every one keeps a horse or more; and the number of those animals consume so much corn as often to occasion a scarcity; the corn and peas raised being (much of it) designed for their subsistence, and that of the cattle, during the long winter. The pasture and moor-land annexed to the farm is common to all the possessors.

"All the farms are open. Inclosures of any form, except in two or three places, are quite unknown: so that there must be a great loss of time in preserving their corn, &c. from trespass. The usual manure is sea-plants, coral, and shells.

"The run-rig farms are now discouraged: but since the tenements are set by roup, or auction, and advanced by an unnatural force to above double the old rent, without any allowance for inclosing, any example set in agriculture, any security of tenure by lengthening the leases, affairs will turn retrograde, and the farms relapse into their old state of rudeness; migration will increase (for it has begun), and the rents be reduced even below their former value: the late rents were scarce 1200 l. a-year; the expected rents 3000.

Produce,
&c.

"The produce of the island is oats; of which about 5000 bolls, each equal to nine Winchester bushels, are sown: 500 of beans, a few peas, and above 1000 bolls of potatoes, are annually set: notwithstanding this, 500 bolls of oat-meal are annually imported, to subsist the natives.

"The live stock of the island is 3183 milch-cows; 2000 cattle, from one to three years old; 1058 horses; 1500 sheep; and 500 goats: many of the two last are killed at Michaelmas, and dried for winter-provision, or sold at Greenock. The cattle are sold from 40 to 50 s. per head, which brings into the island about 1200 l. per annum: I think that the sale of horses also brings in about 300 l. Hogs were introduced here only two years ago. The herring-fishery round the island brings in 300 l. the sale of herring-nets 100 l. and that of thread about 300 l. for a good deal of flax is sown here. These are the exports of the island; but the money that goes out for mere necessities is a melancholy drawback.

"The women manufacture the wool for the clothing of their families; they set the potatoes, and dress and spin the flax. They make butter for exportation, and cheese for their own use.

"The inhabitants in general are sober, religious, and industrious; great part of the summer is employed in getting peat for fuel, the only kind in use here; or in building or repairing their houses, for the badness of the materials requires annual repairs: before and after harvest, they are busied in the herring-fishery; and during winter, the men make their herring-nets; while the women are employed in spinning their linen and woollen yarn. The light they often use is that of lamps. From the beginning of February to the end of May, if the weather permits, they are engaged in labouring their ground: in autumn they burn a great quantity of fern, to make kelp. So that, excepting

Arran.

at new-years-day, at marriages, or at the two or three fairs in that island, they have no leisure for any amusements: no wonder then at their depression of spirits.

"This forms part of the county of Bute, and is subject to the same sort of government; but, besides, justice is administered at the baron's baily-court, who has power to fine as high as 20 s.; can decide in matters of property, not exceeding 40 s.; can imprison for a month; and put delinquents into the stocks for three hours, but that only during day-time.

12
Antiquities
and curiosi-
ties.

"Take a ride into the country: descend into the valley, at the head of the bay; fertile in barley, oats, and peas. See two great stones, in form of columns, set erect, but quite rude: these are common to many nations; are frequent in North-Wales, where they are called *main hirion*, i. e. tall stones, *meini gwir*, or men-pillars, and *lleche*; are frequent in Cornwall, and are also found in other parts of our island: their use is of great antiquity; are mentioned in the Mosaic writings as memorials of the dead, as monuments of friendship, as marks to distinguish places of worship, or of solemn assemblies: the northern nations erected them to perpetuate the memory of great actions, such as remarkable duels, of which there are proofs both in Denmark and in Scotland; and the number of stones was proportionable to the number of great men who fell in the fight: but they were besides erected merely as sepulchral for persons of rank, who had deserved well of their country.

Joh. xxiv.
20.

"Not far from hence is a stone the most singular that I ever remember to have seen, and the only one of the kind that ever fell within my observation: this lies on the ground, is 12 feet long, two broad, one thick; has, at one end, the rude attempt to carve a head and shoulders, and was certainly the first deviation from the former species of monument, the first essay to give to stone a resemblance to the human body. All that the natives say of this is, that it was placed over a giant, and is called *Mac Bhrolochin's* stone.

"Ascend a steep hill, with vast gullies on the side; and, on descending, arrive in a plain inhabited by curlews, resorting there to breed, and which flew round our heads like lapwings. At a place called *Moni-quil* is a small circle of small stones, placed close to each other: whether a little druidical place of worship, or of assembly; or whether a family place of sepulture, as is usual with the northern nations, is not easy to determine. If an urn is found in the centre of this coronet, as is not uncommon, the doubt will cease.

"Pass by the river Machrai, flowing thro' a rocky channel, which in one part has worn thro' a rock, and left so contracted a gap at the top as to form a very easy step a-crofs. Yet not long ago a poor woman in the attempt, after getting one foot over, was struck with such horror at the tremendous torrent beneath, that she remained for some hours in that attitude, not daring to bring her other foot over, till some kind passenger luckily came by, and assisted her out of her distress.

"Arrive at Tormore, an extensive plain of good ground, but quite in a state of nature: seems formerly to have been cultivated; for there appear several vestiges of dikes, which might have served as boundaries. There is a tradition, that in old times the shores were covered with woods, and this was the habitable part.

"The

Arran. "The want of trees in the internal part at present, and the kindly manner in which they grow about Brod-wic, favour this opinion.

"On this plain are the remains of four circles, in a line, extending N. E. by S. W.; very few stones are flanding to perfect the inclosure, but those are of a great size, and stand remote from each other. One is 15 feet high, and 11 in circumference. On the outside of these circles are two others: one differs from all I have seen, consisting of a double circle of stones and a mound within the lesser. Near these are the reliques of a stone chest, formed of five flat stones, the length of two yards in the inside: the lid or top is lost. In the middle of these repositories were placed the urn filled with the ashes of the dead, to prevent its being broken, or to keep the earth from mixing with the burnt remains. In all probability there had been a cairn or heap of stones above.

"By the number of the circles, and by their sequestered situation, this seems to have been sacred ground. These circles were formed for religious purposes: Boethius relates, that Mainna, son of Fergus I. a restorer and cultivator of religion, after the Egyptian manner (as he calls it) instituted several new and solemn ceremonies, and caused great stones to be placed in form of a circle; the largest was situated towards the south, and served as an altar for the sacrifices to the immortal gods. Boethius is right in part of his account: but the object of the worship was the sun; and what confirms this, is the situation of the altar pointed towards that luminary in his meridian glory. In this place the altar and many of the stones are lost; probably carried to build houses and dikes not very remote from the place.

"At a small distance farther is a cairn of a most stupendous size, formed of great pebbles; which are preserved from being scattered about by a circle of large stones that surround the whole base, a circumstance sometimes usual in these monumental heaps.

"Descend thro' a narrow cleft of a rock to a part of the western shore called *Druim-an-dùin*, or the ridge of the fort, from a round tower that stands above. The beach is bounded by cliffs of whitish grit stone, hollowed beneath into vault caves. The most remarkable are those of Fin-mac cuil, or Fingal, the son of Cumhal the father of Ossian, who, tradition says, resided in this island for the sake of hunting. One of these caverns is 112 feet long, and 30 high, narrowing to the top like a Gothic arch; towards the end it branches into two: within these two recesses, which penetrate far, are on each side several small holes, opposite to each other: in these were placed transverse beams, that held the pots in which the heroes seethed their venison; or probably, according to the mode of the times, the bags formed of the skins of animals slain in the chase, which were filled with flesh, and served as kettles sufficiently strong to warm the contents; for the heroes of old devoured their meat half raw, holding, that the juices contained the best nourishment.

"On the front of the division, between these recesses and on one side, are various very rude figures, cut on the stone, of men, of animals, and of a *clymore* or two-handed sword: but whether these were the amusements of the Fingallian age, or of after-times, is not easy to be ascertained; for caves were the retreats

of pirates as well as heroes. Here are several other hollows adjacent, which are shewn as the stable, cellars, and dog-kennel, of the great Mac-cuil: one cave, which is not honoured with a name, is remarkably fine, of great extent, covered with a beautiful flat roof, and very well lighted by two august arches at each end: through one is a fine perspective of the promontory Carn-baan, or the white heap of stones; whose side exhibits a long range of columnar rocks (not false) of hard grey whin-stone, resting on a horizontal stratum of red-stone: at the extremity, one of the columns is insulated, and forms a fine obelisk.

"After riding some time along the shore, ascend the promontory. On the summit is an ancient retreat, secured on the land side by a great dike of loose stones, that incloses the accessible part: within is a single stone, set erect; perhaps to mark the spot where the chieftain held his council, or from whence he delivered his orders.

"From this shore is a fine view of Kintyre, the western side of Arran being separated from it by a strait about eight miles wide.

"Leave the hills, and see, at *Fearling*, another stupendous cairn 114 feet over, and of a vast height; and from two of the opposite sides are two vast ridges; the whole formed of rounded stones, or pebbles, brought from the shores. These immense accumulations of stones are the sepulchral protection of the heroes among the ancient natives of our islands: the stone chests, the repository of the urns and ashes, are lodged in the earth beneath; sometimes one, sometimes more, are found thus deposited; and I have one instance of as many as 17 of these stone chests being discovered under the same cairn. The learned have assigned other causes for these heaps of stones: have supposed them to have been, in times of inauguration, the places where the chieftain-elect stood to shew himself to best advantage to the people; or the place from whence judgment was pronounced; or to have been erected on the road-side in honour of Mercury; or to have been formed in memory of some solemn compact. These might have been the reasons, in some instances, where the evidences of stone-chests and urns are wanting; but those generally are found to overthrow all other systems.

"These piles may justly be supposed to have been proportioned in size to the rank of the person, or to his popularity: the people of a whole district assembled to shew their respect to the deceased; and, by an active honouring of his memory, soon accumulated heaps equal to those that astonish us at this time. But these honours were not merely those of the day; as long as the memory of the deceased endured, not a passenger went by without adding a stone to the heap: they supposed it would be an honour to the dead, and acceptable to his manes.

Quamquam secessas, non est mora longa: licebit,
Ipsæ te ter pulvere, curas.

To this moment there is a proverbial expression among the highlanders allusive to the old practice: a suppliant will tell his patron, *Curri mi cloch er du charne*, "I will add a stone to your cairn;" meaning, When you are no more, I will do all possible honour to your memory.

"There was another species of honour paid to the chieftains, that I believe is still retained in this island, but

ARRAS,
Arras.

but the reason is quite lost; that of swearing by his name, and paying as great a respect to that as to the most sacred oath: a familiar one in Arras is, "by Nail;" it is at present unintelligible, yet is suspected to have been the name of some ancient hero.

"The cairns are to be found in all parts of our islands, in Cornwall, Wales, and all parts of North Britain; they were in use among the northern nations; Dahlberg, in his 323^d plate, has given the figure of one. In Wales they are called *carneddau*; but the proverb taken from them, with up, is not of the complimentary kind: *Karn ar dy ben*, or, A cairn on your head, is a token of imprecation."

ARRAS, the capital city of Artois, a province in the French Netherlands. It is seated on a mountain; and the parts about it are full of quarries, where they get stone for building. It is divided into two parts, the town and the city. The abbe of St Vaast is lord of the town, and the bishop of Arras of the city, which is the least part. They are divided by a strong wall, a large fosse, and the little river Chrinchron, which 100 paces below falls into the Scarp. They are both well fortified, inclosed by high ramparts, and by double deep fosses, which in several places are cut out of the rock. It has four gates; and, since the French are become masters of it, has a strong citadel with five bastions. The most remarkable places are, the great square where the principal market is kept; this is full of fine buildings, with piazzas all round it like those of Covent-garden. Not far from this is the lesser market, which contains the town house, a very noble structure, with a high tower covered with a crown, on the top of which is a brazen lion which serves for a vane. In the midst of this market is the chapel of the Holy Candle, which the papists pretend was brought by the Virgin Mary herself above 600 years ago, when the city was afflicted with divers diseases, and every one that touched the candle was cured; it is kept in a silver shrine. This chapel has a spire-steeple, adorned with several statues. The cathedral church of Notre-Dame stands in the city: it is a very large Gothic building, extremely well adorned; the tower is very high, and has a fine clock embellished with little figures in bronze, which represent the passion of Jesus Christ; they pass before the bell to strike the hours and half hours. In this church there is a silver shrine, enriched with pearls and diamonds; which contains a sort of wool, which they call *manna*; that they say fell from heaven in the time of a great drought, almost 1400 years ago: they carry it very solemnly in procession when they want rain. The abbey-church of St Vedast is the greatest ornament of Arras, it being adorned with a fine steeple, and seats for the monks of admirable workmanship; the pulpit is of brass, fashioned like a tree, supported by two bears of the same metal, sitting on their hind legs; there are little bears in different postures coming to climb up the tree. The chimies are remarkable for the different tunes which they play. There are 11 parish churches, and a great many convents of men and women. It is from this city that the tapestry called *arras hangings* takes its denomination.—E. Long. 2. 56. N. Lat. 50. 17.

ARRAS, or *Araxes*, is also the name of a river of Georgia, which discharges itself into the Caspian sea.

ARRAY, in law, the ranking or setting forth of

a jury, or ineffect of men impanelled on a cause.

Battle-ARRAY, the order or disposition of an army, drawn up with a view to engage the enemy."

ARREARS, the remainder of a sum due, or money remaining in the hands of an accountant. It likewise signifies the money due for rent, wages, &c. or what remains unpaid of pensions, taxes, &c.

ARRENTATION, in the forest laws, implies the licensing the owner of lands in a forest to inclose them with a low hedge and a small ditch, in consideration of a yearly rent.

ARREST, in English law, (from the French word *arrester*, to stop or stay), is the restraint of a man's person, obliging him to be obedient to the law; and is defined to be the execution of the command of some court of record or office of justice. An arrest is the beginning of imprisonment; where a man is first taken, and restrained of his liberty, by power or colour of a lawful warrant.

Arrests are either in *civil* or *criminal* cases.

1. An arrest in a *civil cause* is defined to be the apprehending or restraining one's person by process in execution of the command of some court.

An arrest must be by corporal seizing or touching the defendant's body; after which the bailiff may justify breaking open the house in which he is, to take him; otherwise he has no such power; but must watch his opportunity to arrest him. For every man's house is looked upon by the law to be his castle of defence and asylum, wherein he should suffer no violence. Which principle is carried so far in the civil law, that, for the most part, not so much as a common citation or summons, much less an arrest, can be executed upon a man within his own walls. Peers of the realm, members of parliament, and corporations, are privileged from arrests; and of course from outlawries. And against them the process to enforce an appearance must be by summons and distress *infinite*, instead of a *capias*. Also clerks, attorneys, and all other persons attending the courts of justice (for attorneys, being officers of the court, are always supposed to be there attending), are not liable to be arrested by the ordinary process of the court, but must be sued by bill (called usually a *bill of privilege*) as being personally present in court. Clergymen performing divine service, and not merely staying in the church with a fraudulent design, are for the time privileged from arrests, by statute 50 Edw. III. c. 5. and 1 Rich. II. c. 16.; as likewise members of convocation actually attending thereon, by statute 8 Hen. VI. c. 1. Suitors, witnesses, and other persons, necessarily attending any courts of record upon business, are not to be arrested during their actual attendance, which includes the necessary coming and returning. Seamen in the king's service are privileged from arrests for debts under 20*l*. (1 Geo. II. c. 14. and 14 Geo. II. c. 38.); and soldiers or marines are not liable to arrests for a debt of less than 10*l*. (30 Geo. II. c. 6, 11.) And no arrest can be made in the king's preference, nor within the verge of his royal palace, nor in any place where the king's justices are actually sitting. The king hath moreover a special prerogative (which indeed is very seldom exerted), that he may by his *writ of protection* deliver a defendant from all personal, and many real, suits, for one year at a time, and no longer; in respect of his being engaged in his service out of the realm.

And

Array
Arrest.

* See Army

Arrest.

And the king also by the common law might take his creditor into his protection, so that no one might sue or arrest him till the king's debt were paid: but by the statute 25 Edw. III. §. 5. c. 19. notwithstanding such protection, another creditor may proceed to judgment against him, with a stay of execution, till the king's debt be paid; unless such creditor will undertake for the king's debt, and then he shall have execution for both. And, lastly, by statute 29 Car. II. c. 7. no arrest can be made, nor process served, upon a Sunday, except for treason, felony, or breach of the peace.

2. An arrest in a *criminal cause* is the apprehending or restraining one's person, in order to be forthcoming to answer an alleged crime. To this arrest all persons whatsoever are, without distinction, equally liable; and doors may be broken open to arrest the offender: but no man is to be arrested, unless charged with such a crime as will at least justify holding him to bail when taken. There is this difference also between arrests in civil and criminal cases, that none shall be arrested for debt, trespass, or other cause of action, but by virtue of a precept or commandment out of some court; but for treason, felony, or breach of the peace, any man may arrest with or without warrant or precept *. But the king cannot command any one by word of mouth to be arrested; for he must do it by writ, or order of his courts, according to law: nor may the king arrest any man for suspicion of treason, or felony, as his subjects may; because, if he doth wrong, the party cannot have an action against him.

Arrests by private persons are in some cases commanded. Persons present at the committing of a felony must use their endeavours to apprehend the offender, under penalty of fine and imprisonment; and they are also, with the utmost diligence, to pursue and endeavour to take all those who shall be guilty thereof, out of their view, upon a hue and cry levied against them *. By the vagrant act 17 Geo. II. c. 5. every person may apprehend beggars and vagrants; and every private person is bound to assist an officer requiring him to apprehend a felon.

In some cases likewise arrests by private persons are rewarded by law. By the 4 and 5 William and Mary, c. 8. persons apprehending highwaymen, and prosecuting them to a conviction, are intitled to a reward of 40*l.* and if they are killed in the attempt, their executors, &c. are intitled to the like reward. By the 6 and 7 William III. c. 17. persons apprehending counterfeiters and clippers of the coin, and prosecuting them to conviction, are intitled to 40*l.*

By 5 Ann, c. 31. persons who shall take any one guilty of burglary, or the felonious breaking and entering any house in the day-time, and prosecute them to conviction, shall receive the sum of 40*l.* within one month after such conviction.

With regard to arrests by public officers, as watchmen, constables, &c. they are either made by their own authority, which differs but very little from the power of a private person; or they are made by a warrant from a justice of peace. See WARRANT.

ARREST of Judgment, in law, the assigning just reason why judgment should not pass: as, Want of notice of the trial; a material defect in the pleading; when the record differs from the deed pleaded; when persons are mis-named; where more is given by the verdict

than is laid in the declaration, &c. This may be done either in criminal or civil cases.

ARRESTMENT, in Scots law, signifies the securing of a criminal till trial, or till he find caution to stand trial, in what are called *bailable crimes*. In civil cases, it signifies either the detaining of strangers or natives in *meditatione fuge*, till they find caution *judicio fisci*, or the attaching the effects of a stranger in order to found jurisdiction. But, in the most general acceptance of the word, it denotes that diligence by which a creditor detains the goods or effects of his debtor in the hands of third parties till the debt due to him be either paid or secured. See Law, Part III. N^o clxxviii.

ARRESTO FACTO SUPER BONIS, &c. a writ brought by a denizen against the goods of aliens found within this kingdom, as a recompence for goods taken from him in a foreign country.

ARRESTS, in farriery, mangy tumours upon a horse's hinder-legs, between the ham and the pastern.

ARRETUM, (Cicero, Cæsar); *Arretium*, (Ptolemy); *Urbs Arretinorum*, (Polybius); one of the twelve ancient towns of Tuscany, near the Arnus and Clanis, situated in a pleasant valley. Now *Arezzo*, 42 miles east of Florence. E. Long. 13. 18. Lat. 43. 15.

ARRHABONARII, a sect of Christians, who held that the eucharist is neither the real flesh or blood of Christ, nor yet the sign of them; but only the pledge or earnest thereof.

ARRHEPHORIA, a feast among the Athenians, instituted in honour of Minerva, and Herse daughter of Cecrops.

ARRIAN, a famous philosopher and historian under the emperor Hadrian and the two Antonines, was born at Nicomedia in Bithynia. His great learning and eloquence procured him the title of *The second Xenophon*; and raised him to the most considerable dignities at Rome, even the consulship itself. We have 4 books of his *Dissertations upon Epictetus*, whose scholar he had been; and his *History of Alexander the Great*, in 7 books, is greatly admired by the best judges.

ARRIERE, the hinder or posterior part of any thing.

ARRIERE *Ban*, in the French customs, is a general proclamation, whereby the king summons to the war all that hold of him, both his vassals, *i. e.* the noblesse, and the vassals of his vassals.

ARRIERE *Fee* or *Fief*, is a fee dependant on a superior one. These fees commenced, when the dukes and counts, rendering their governments hereditary in their families, distributed to their officers parts of the royal domains which they found in their respective provinces, and even permitted those officers to gratify the soldiers under them in the same manner.

ARROBAS, or AROBAS, a weight used in Spain, Portugal, and the foreign dominions of both. The Arrobas of Portugal is also called *Arata*, and contains 32 Lisbon pounds; that of Spain contains 25 Spanish pounds. In Peru it is called *Arroue*.

ARROE, a small island of Denmark, in the Baltic Sea, a little south of the island of Funen. It is eight miles in length, and about two in breadth; and produces corn, annised, black cattle, and horses. It has three

Arrestment
Arroc.

See War-
rant.

See Hue
and Cry.

Arrijo
Arion.

three parishes, the most considerable of which is Koping. It stands at the fourth side of the island, in the bottom of a bay, and has a port with some trade. E. Long. 9. 40. N. Lat. 55. 20.

ARROJO, DE ST SERVAN, a town of Spain, in Estremadura. W. Long. 5. 20. N. Lat. 38. 40.

ARRONDEE, in heraldry, a cross, the arms of which are composed of sections of a circle, not opposite to each other, so as to make the arms bulge out thicker in one part than another; but the sections of each arm lying the same way, so that the arm is every where of an equal thickness, and all of them terminating at the edge of the escutcheon like the plain cross.

* See Bow. ARROW, a missile weapon of offence, slender, pointed, and barbed, to be cast or shot with a bow *. Arrows are also called *shafts*.

ARROW-Makers are called *fletchers*; and were formerly, as well as bowyers, persons of great consequence in the commonwealth.

ARSCHIN, in commerce, a long measure used in China to measure fusts. Four arschins made three yards of London.

ARSHOT, a town of the Austrian Netherlands, situated about fourteen miles east of the city of Mechlin, in E. Long. 4. 45. N. L. 51. 5.

ARSENAL, a royal or public magazine, or place appointed for the making and keeping of arms necessary either for defence or assault.

* See Chemi. ARSENIC, a poisonous mineral preparation, which is either white, red, or yellow, prepared from the flowers of cobalt *.

ARSENIUS, a deacon of the Roman church, of great learning and piety. He was pitched upon by the Pope to go to the emperor Theodosius, as tutor to his son Arcadius. Arsenius arrived at Constantinople in the year 383. The emperor happening one day to go into the room where Arsenius was instructing Arcadius, his son was seated and the preceptor standing; at this he was exceedingly displeased, took from his son the imperial ornaments, made Arsenius sit in his place, and ordered Arcadius for the future to receive his lessons standing uncovered. Arcadius, however, profited but little by his tutor's instructions, for some time after he formed a design of dispatching him. The officer, to whom Arcadius had applied for this purpose, divulged the affair to Arsenius, who retired to the deserts of Scete, where he passed many years in the exercises of the most strict and fervent devotion. He died there, at 95 years of age.

ARSIS and THESIS, in music, is a term applied to compositions in which one part rises and the other falls.

ARSMART, in botany. See PERSICARIA.

ARSON, in English law, is the malicious and wilful burning of the house or out-house of another man; which is felony at common law.

This is an offence of very great malignity, and much more pernicious to the public than simple theft: because, first, it is an offence against that right of habitation which is acquired by the law of nature as well as by the laws of society; next, because of the terror and confusion that necessarily attends it; and, lastly, because in simple theft the thing stolen only changes its master, but still remains in *esse* for the be-

nefit of the public, whereas by burning the very substance is absolutely destroyed. It is also frequently more destructive than murder itself, of which too it is often the cause: since murder, atrocious as it is, seldom extends beyond the felonious act designed; whereas fire too frequently involves in the common calamity persons unknown to the incendiary, and not intended to be hurt by him, and friends as well as enemies.

ART is defined by Lord Bacon, A proper disposal of the things of nature by human thought and experience, so as to answer the several purposes of mankind; in which sense, *art* stands opposed to *nature*.

Art is principally used for a system of rules serving to facilitate the performance of certain actions; in which sense it stands opposed to *science*, or a system of speculative principles.

Arts are commonly divided into *useful* or *mechanic*, *liberal* or *polite*. The former are those wherein the *hand* and *body* are more concerned than the *mind*; of which kind are most of those which furnish us with the *necessaries* of life, and are properly known by the name of *trades*; as baking, brewing, carpentry, smithery, weaving, &c.—The latter are such as depend more on the labour of the *mind* than that of the *hand*; they are the produce of the *imagination*, their essence consists in *expression*, and their end is *pleasure*. Of this kind are poetry, painting, music, &c.

Progress of the ARTS. Some useful arts must be nearly coeval with the human race; for food, clothing, and habitation, even in their original simplicity, require some art. Many other arts are of such antiquity, as to place the inventors beyond the reach of tradition. Several have gradually crept into existence, without an inventor. The busy mind, however, accustomed to a beginning in things, cannot rest till it finds or imagines a beginning to every art. The most probable conjectures of this nature the reader may see in the historical introductions to the different articles.

In all countries where the people are barbarous and illiterate, the progress of arts is extremely slow. It is vouched by an old French poem, that the virtues of the loadstone were known in France before anno 1180. The mariner's compass was exhibited at Venice anno 1260, by Paulus Venetus, as his own invention. John Goya of Amalphi was the first who, many years afterward, used it in navigation; and also passed for being the inventor. Tho' it was used in China for navigation long before it was known in Europe, yet to this day it is not so perfect as in Europe. Instead of suspending it in order to make it act freely, it is placed upon a bed of sand, by which every motion of the ship disturbs its operation. Hand-mills, termed *guerns*, were early used for grinding corn; and when corn came to be raised in greater quantity, horse-mills succeeded. Water-mills for grinding corn are described by Vitruvius. Wind-mills were known in Greece and in Arabia as early as the seventh century; and yet no mention is made of them in Italy till the fourteenth. That they were not known in England in the reign of Henry VIII. appears from a household book of an earl of Northumberland, cotemporary with that king, stating an allowance for three mill-horses, "two to draw in the mill, and one to carry stuff to the mill and fro." Water-mills for corn must in England have been of a later date. The ancients had mirror-glasses, and employed

Art.

Origin

and

progress of
useful arts,
[Kaim's
Sketches,
Sk. V.]

ployed glass to imitate crystal vases and goblets: yet they never thought of using it in windows. In the 13th century, the Venetians were the only people who had the art of making crystal glass for mirrors. A clock that strikes the hours was unknown in Europe till the end of the 12th century. And hence the custom of employing men to proclaim the hours during night; which to this day continues in Germany, Flanders, and England. Galileo was the first who conceived an idea that a pendulum might be useful for measuring time; and Huygens was the first who put the idea in execution, by making a pendulum clock. Hook, in the year 1660, invented a spiral spring for a watch, though a watch was far from being a new invention. Paper was made no earlier than the 14th century; and the invention of printing was a century later. Silk manufactures were long established in Greece before silkworms were introduced there. The manufacturers were provided with raw silk from Persia: but that commerce being frequently interrupted by war, two monks, in the reign of Justinian, brought eggs of the silkworm from Hindostan, and taught their countrymen the method of managing them.—The art of reading made a very slow progress. To encourage that art in England, the capital punishment for murder was remitted if the criminal could but read, which in law-language is termed *benefit of clergy*. One would imagine that the art must have made a very rapid progress when so greatly favoured: but there is a signal proof of the contrary; for so small an edition of the Bible as 600 copies, translated into English in the reign of Henry VIII. was not wholly sold off in three years. The people of England must have been profoundly ignorant in Queen Elizabeth's time, when a forged clause added to the 20th article of the English creed passed unnoticed till about 40 years ago.

The discoveries of the Portuguese in the west coast of Africa is a remarkable instance of the slow progress of arts. In the beginning of the 15th century, they were totally ignorant of that coast beyond Cape Non, 28 deg. north latitude. In 1410, the celebrated Prince Henry of Portugal fitted out a fleet for discoveries, which proceeded along the coast to Cape Bojadore in 26 deg. but had not courage to double it. In 1418, Tristram Vaz discovered the island Porto Santo; and the year after, the island Madeira was discovered. In 1439, a Portuguese captain doubled Cape Bojadore; and the next year the Portuguese reached Cape Blanco, lat. 20. deg. In 1446, Nuna Tristram doubled Cape Verd, lat. 14. 40. In 1448, Don Gonzalo Vallo took possession of the Azores. In 1449, the islands of Cape Verd were discovered for Don Henry. In 1471, Pedro d'Escovar discovered the island St Thomas and Prince's island. In 1484, Diego Cam discovered the kingdom of Congo. In 1486, Bartholomew Diaz, employed by John II. of Portugal, doubled the Cape of Good Hope, which he called *Carbo Tormentose*, from the tempestuous weather he found in the passage.

The exertion of national spirit upon any particular art, promotes activity to prosecute other arts. The Romans, by constant study, came to excel in the art of war, which led them naturally to improve upon other arts. Having, in the progress of society, acquired some degree of taste and polish, a talent for writing broke forth. Nevius composed in verse seven books

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of the Punic war; besides comedies, replete with bitter railery against the nobility. Ennius wrote annals, and an epic poem. Lucius Andronicus was the father of dramatic poetry in Rome. Pacuvius wrote tragedies. Plautus and Terence wrote comedies. Lucilius composed satires, which Cicero esteems to be slight and void of erudition. Fabius Pictor, Cincius Alimentus, Piso Frugi, Valerius Antias, and Cato, were rather annalists than historians, confining themselves to naked facts, ranged in order of time. The genius of the Romans for the fine arts was much inflamed by Greek learning, when free intercourse between the two nations was opened. Many of those who made the greatest figure in the Roman state commenced authors; Cæsar, Cicero, &c. Sylla composed memoirs of his own transactions, a work much esteemed even in the days of Plutarch.

The progress of art seldom fails to be rapid, when a people happen to be roused out of a torpid state by some fortunate change of circumstances: prosperity contrasted with former abatement, gives to the mind a spring, which is vigorously exerted in every new pursuit. The Athenians made but a mean figure under the tyranny of Pisistratus; but upon regaining freedom and independence, they were converted into heroes. Miletus, a Greek city of Ionia, being destroyed by the king of Persia, and the inhabitants made slaves; the Athenians, deeply affected with the misery of their brethren, boldly attacked the king in his own dominions, and burnt the city of Sardis. In less than 10 years after, they gained a signal victory at Marathon; and, under Themistocles, made head against that prodigious army with which Xerxes threatened utter ruin to Greece. Such prosperity produced its usual effect: arts flourished with arms, and Athens became the chief theatre for sciences as well as for fine arts. The reign of Augustus Cæsar, which put an end to the rancour of civil war, and restored peace to Rome with the comforts of society, proved an auspicious æra for literature; and produced a cloud of Latin historians, poets, and philosophers, to whom the moderns are indebted for their taste and talents. One who makes a figure rouses emulation in all: one catches fire from another, and the national spirit is every where triumphant: classical works are composed, and useful discoveries made in every art and science. With regard to Rome, it is true, that the Roman government under Augustus was in effect despotic: but despotic, in that single instance, made no obstruction to literature, it having been the policy of that reign to hide power as much as possible. A similar revolution happened in Tuscany about three centuries ago. That country having been divided into a number of small republics, the people, excited by mutual hatred between small nations in close neighbourhood, became ferocious and bloody, flaming with revenge for the slightest offence. These republics being united under the Great Duke of Tuscany, enjoyed the sweets of peace in a mild government. That comfortable revolution, which made the deeper impression by a retrospect to recent calamities, roused the national spirit, and produced ardent application to arts and literature. The restoration of the royal family in England, which put an end to a cruel and venomous civil war, promoted improvements of every kind: arts and industry made a rapid progress among the people, though left to themselves by a weak

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Arts.

and fluctuating administration. Had the nation, upon that favourable turn of fortune, been blessed with a succession of able and virtuous princes, to what a height might not arts and sciences have been carried! In Scotland, a favourable period for improvement was the reign of the first Robert, after shaking off the English yoke: but the domineering spirit of the feudal system rendered abortive every attempt. The restoration of the royal family, mentioned above, animated the legislature of Scotland to promote manufactures of various kinds: but in vain; for the union of the two crowns had introduced despotism into Scotland, which sunk the genius of the people, and rendered them heartless and indolent. Liberty, indeed, and many other advantages, were procured to them by the union of the two kingdoms; but the salutary effects were long suspended by mutual enmity, such as commonly subsists between neighbouring nations. Enmity wore out gradually, and the eyes of the Scots were opened to the advantages of their present condition; the national spirit was roused to emulate and to excel; talents were exerted, hitherto latent; and Scotland at present makes a figure in arts and sciences, above what it ever made while an independent kingdom.

Another cause of activity and animation, is the being engaged in some important action of doubtful event; a struggle for liberty, the resisting a potent invader, or the like. Greece, divided into small states frequently at war with each other, advanced literature and the fine arts to unrivalled perfection. The Corinthians, while engaged in a perilous war for defence of their liberties, exerted a vigorous national spirit: they founded an university for arts and sciences, a public library, and a public bank. After a long stupor during the dark ages of Christianity, arts and literature revived among the turbulent states of Italy. The royal society in London, and the academy of sciences in Paris, were both of them instituted after civil wars that had animated the people and roused their activity.

As the progress of arts and sciences toward perfection is greatly promoted by emulation, nothing is more fatal to an art or science than to remove that spur, as where some extraordinary genius appears who soars above rivalry. Mathematics seem to be declining in Britain: the great Newton, having surpassed all the ancients, has not left to the moderns even the faintest hope of equalling him; and what man will enter the lists who despairs of victory?

In a country thinly peopled, where even necessary arts want hands, it is common to see one person exercising more arts than one: in several parts of Scotland, one man serves as a physician, surgeon, and apothecary. In every populous country, even simple arts are split into parts, and each part has an artill appropriated to it. In the large towns of ancient Egypt, a physician was confined to a single disease. In mechanic arts that method is excellent. As a hand confined to a single operation becomes both expert and expeditious, a mechanic art is perfected by having its different operations distributed among the greatest number of hands: many hands are employed in making a watch; and a still greater number in manufacturing a web of woollen cloth. Various arts or operations carried on by the same man, enervate his mind, because they exercise different faculties; and as he cannot be

equally expert in every art or operation, he is frequently reduced to supply want of skill by thought and invention. Constant application, on the contrary, to a single operation, confines the mind to a single object, and excludes all thought and invention: in such a train of life, the operator becomes dull and stupid, like a beast of burden. The difference is visible in the manners of the people: in a country, where, from want of hands, several occupations must be carried on by the same person, the people are knowing and conversable: in a populous country, where manufactures flourish, they are ignorant and unsocial. The same effect is equally visible in countries where an art or manufacture is confined to a certain class of men. It is visible in Indostan, where the people are divided into casts, which never mix even by marriage, and where every man follows his father's trade. The Dutch lint-boors are a similar instance: the same families carry on the trade from generation to generation; and are accordingly ignorant and brutish even beyond other Dutch peasants. The inhabitants of Buckhaven, a sea-port in the county of Fife, were originally a colony of foreigners, invited hither to teach our people the art of fishing. They continue fishers to this day, marry among themselves, have little intercourse with their neighbours, and are dull and stupid to a proverb.

Useful arts paved the way to fine arts. Men upon whom the former had bestowed every convenience, turned their thoughts to the latter. Beauty was studied in objects of sight; and men of taste attached themselves to the fine arts, which multiplied their enjoyments and improved their benevolence. Sculpture and painting made an early figure in Greece; which afforded plenty of beautiful originals to be copied in these imitative arts. Statuary, a more simple imitation than painting, was sooner brought to perfection: the statue of Jupiter by Phidias, and of Juno by Polyctetes, though the admiration of all the world, were executed long before the art of light and shade was known. Apollodorus, and Zeuxis his disciple, who flourished in the 15th Olympiad, were the first who figured in that art. Another cause concurred to advance statuary before painting in Greece, viz. a great demand for statues of their gods. Architecture, as a fine art, made a slower progress. Proportions, upon which its elegance chiefly depends, cannot be accurately ascertained, but by an infinity of trials in great buildings: a model cannot be relied on; for a large and a small building, even of the same form, require different proportions.

From the fine arts mentioned, we proceed to literature. It is agreed, among all antiquaries, that the first writings were in verse, and that writing in prose was of a much later date. The first Greek who wrote in prose was Pherecides Syrus: the first Roman was Appian Cæcus, who composed a declamation against Pyrrhus. The four books of the Chatah Bhade, which is the sacred book of Hindostan, are composed in verse stanzas; and the Arabian compositions in prose followed long after those in verse. To account for that singular fact, many learned pens have been employed; but without success. By some it has been urged, that as memory is the only record of events where writing is unknown, history originally was composed in verse, for the sake of memory. This is not satisfactory. To

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undertake the painful task of composing in verse, merely for the sake of memory, would require more foresight than ever was exerted by a Barbarian: not to mention that other means were used for preserving the memory of remarkable events; a heap of stones, a pillar, or other object that catches the eye. The account given by Longinus is more ingenious. In a fragment of his treatise on verse, the only part that remains, he observes, "that measure or verse belongs to poetry, "because poetry represents the various passions with "their language; for which reason the ancients, in "their ordinary discourse, delivered their thoughts in "verse rather than in prose." Longinus thought, that anciently men were more exposed to accidents and dangers, than when they were protected by good government and by fortified cities. But he seems not to have adverted, that fear and grief, inspired by dangers and misfortunes, are better suited to humble prose than to elevated verse. It may be added, that however natural poetical diction may be when one is animated with any vivid passion, it is not supposable that the ancients never wrote nor spoke but when excited by passion. Their history, their laws, their covenants, were certainly not composed in that tone of mind.

An important article in the progress of the fine arts, which writers have not sufficiently attended to, will, perhaps, explain this mystery. The article is the profession of a bard, which sprung up in early times, before writing was known *, and died away gradually as writing turned more and more common †.

The songs of the bards, being universal favourites, were certainly the first compositions that writing was employed upon: they would be carefully collected by the most skilful writers, in order to preserve them in perpetual remembrance. The following part of the progress is obvious. People acquainted with no written compositions, but what were in verse, composed in verse their laws, their religious ceremonies, and every memorable transaction that was intended to be preserved in memory by writing. But when subjects of writing multiplied, and became more and more involved; when people began to reason, to teach, and to harangue; they were obliged to descend to humble prose; for to confine a writer or speaker to verse in handling subjects of that nature, would be a burden unportable.

The prose compositions of early historians are all of them dramatic. A writer delitute of art is naturally prompted to relate facts as he saw them performed: he introduces his personages as speaking and conferring; and he himself relates what was acted, and not spoke. The historical books of the Old Testament are composed in that mode; and so addicted to the dramatic are the authors of those books, that they frequently introduce God himself into the dialogue. At the same time, the simplicity of that mode is happily suited to the poverty of every language in its early periods. The dramatic mode has a delicious effect in expressing sentiment, and every thing that is simple and tender. Read, as an instance of a low incident becoming, by that means, not a little interesting, Ruth i. 8. to iv. 16.

The dramatic mode is far from pleasing so much in relating bare historical facts. Read, as an example, the story of Adonijah in 1 Kings i. 11.—49.

In that passage there are frequent repetitions; not

however by the same person, but by different persons who have occasion in the course of the story to say the same things; which is natural in the dramatic mode, where things are represented precisely as they were transacted. In that view, Homer's repetitions are a beauty, not a blemish; for they are confined to the dramatic part, and never occur in the narrative.

But the dramatic mode of composition, however pleasing, is tedious and intolerable in a long history. In the progress of society new appetites and new passions arise; men come to be involved with each other in various connections; incidents and events multiply, and history becomes intricate by an endless variety of circumstances. Dialogue accordingly is more sparingly used, and in history plain narration is mixed with it. Narration is as it were the ground-work; and dialogue is raised upon it, like flowers in embroidery. Homer is admitted by all to be the great master in that mode of composition.

The narrative mode came in time so to prevail, that in a long chain of history, the writer commonly leaves off dialogue altogether. Early writers of that kind appear to have very little judgment in distinguishing capital facts from minute circumstances, such as can be supplied by the reader without being mentioned. The history of the Trojan war by Dares Phrygius is a curious instance of that cold and creeping manner of composition. The Roman histories before the time of Cicero are chronicles merely. Cato, Fabius Pictor, and Piso, confined themselves to naked facts. In the Augustæ Historiæ Scriptores we find nothing but a jejune narrative of facts, commonly of very little moment, concerning a degenerate people, without a single incident that can rouse the imagination or exercise the judgment. The Monkish histories are all of them composed in the same manner.

The dry narrative manner being very little interesting or agreeable, a taste for embellishment prompted some writers to be copious and verbose. Saxo Grammaticus, who in the 12th century composed in Latin a history of Denmark, surprisingly pure at that early period, is extremely verbose and full of tautologies. Such a style, at any rate unpleasant, is intolerable in a modern tongue, before it is enriched with a stock of phrases for expressing aptly the great variety of incidents that enter into history.

The perfection of historical composition, which writers at last attain to after wandering through various imperfect modes, is a relation of interesting facts, connected with their motives and consequences. An history of that kind is truly a chain of causes and effects.

The history of Thucydides, and still more that of Tacitus, are shining instances of that mode.

Eloquence was of a later date than the art of literary composition; for till the latter was improved, there were no models for studying the former. Cicero's oration for Roscius is composed in a style diffuse and highly ornamented; which, says Plutarch, was universally approved, because at that time the style in Asia, introduced into Rome with its luxury, was in high vogue. But Cicero, in a journey to Greece, where he leisurely studied Greek authors, was taught to prune off superfluities, and to purify his style, which he did to a high degree of refinement. He introduced into his native tongue a sweetness, a grace, a ma-

4 U 2 jectly,

* See the article Writing.
† See Bar.

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8
Comedy.

jeſty, that ſurprized the world, and even the Romans themſelves. Cicero obſerves with great regret, that if ambition for power had not drawn Julius Cæſar from the bar to command legions, he would have become the moſt complete orator in the world. So partial are men to the profeſſion in which they excel. Eloquence triumphs in a popular aſſembly, makes ſome figure in a court of law compoſed of many judges, very little where there is but a ſingle judge, and none at all in a deſpotic government. Eloquence flouriſhed in the republics of Athens and of Rome; and makes ſome figure at preſent in a Britiſh houſe of Commons.

7
Tragedy.

The Greek ſtage has been juſtly admired among all polite nations. The tragedies of Sophocles and Euripides in particular are by all critics held to be perfect in their kind, excellent models for imitation, but far above rivalſhip. If the Greek ſtage was ſo early brought to maturity, it is a phenomenon not a little ſingular in the progreſs of arts. The Greek tragedy made a rapid progreſs from Theſpis to Sophocles and Euripides, whoſe compositions are wonderful productions of genius, conſidering that the Greeks at that period were but beginning to emerge from roughneſs and barbarity into a taſte for literature. The compositions of Eſchylus, Sophocles, and Euripides, muſt have been highly reliſhed among a people who had no idea of any thing more perfect. We judge by comparison, and every work is held to be perfect that has no rival. It ought at the ſame time to be kept in view, that it was not the dialogue which chiefly enchanted the Athenians, nor variety in the paſſions repreſented, nor perfection in the actors; but machinery and pompous decoration, joined with exquiſite muſic. That theſe particulars were carried to the greateſt height, we may with certainty conclude from the extravagant ſums beſtowed on them: the exhibiting a ſingle tragedy was more expensive to the Athenians, than their fleet or their army in any ſingle campaign.

One would imagine, however, that theſe compositions were too ſimple to enchant for ever; as variety in action, ſentiment, and paſſion, is requiſite, without which the ſtage will not continue long a favourite entertainment: and yet we find not a ſingle improvement attempted after the days of Sophocles and Euripides. The manner of performance, indeed, prevented abſolutely any improvement. A fluctuation of paſſion and refined ſentiments would have made no figure on the Grecian ſtage. Imagine the diſcordant ſcene between Brutus and Caſſius in Julius Cæſar to be there exhibited, or the handkerchief in the Moor of Venice: how ſlight would be their effect, when pronounced in a maſk, and through a pipe? The workings of nature upon the countenance, and the ſtreſſions of voice expreſſive of various feelings, ſo deeply affecting in modern representation, would have been entirely loſt. If a great genius had ariſen with talents for compoſing a pathetic tragedy in perfection, he would have made no figure in Greece. An edifice muſt have been erected of a moderate ſize: new actors muſt have been trained to act with a bare face, and to pronounce in their own voice. And after all there remained a greater miracle ſtill to be performed, *viz.* a total reformation of taſte in the people of Athens. In one word, the ſimplicity of the Greek tragedy was ſuited to the manner of acting; and that manner excluded all improvements.

With reſpect to comedy, it does not appear that the Greek comedy furpaſſed the tragedy in its progreſs toward perfection. Horace mentions three ſtages of Greek comedy. The firſt well ſuited to the rough and coarſe manners of the Greeks, when Eupolis, Cratinus, and Ariſtophanes, wrote. Theſe authors were not aſhamed to repreſent on the ſtage real perſons, not even diſguiſing their names: of which we have a ſtriking inſtance in a comedy of Ariſtophanes, called *The Clouds*, where Socrates is introduced, and moſt contemptuouſly treated. This fort of comedy, ſparing neither gods nor men, was reſtrained by the magiſtrates of Athens, ſo far as to prohibit perſons to be named on the ſtage. This led writers to do what is done at preſent: the characters and manners of known perſons were painted ſo much to the life, that there could be no miſtake; and the ſatire was indeed heightened by this regulation, as it was an additional pleaſure to find out the names that were meant in the representation. This was termed the *middle comedy*. But as there ſtill remained too great ſcope for obloquy and licentiousneſs, a law was made prohibiting real events or incidents to be introduced upon the ſtage. This law happily baniſhed ſatire againſt individuals, and confined it to manners and cuſtoms in general. Obedient to this law are the comedies of Menander, Philemon, and Diphilus, who flouriſhed about 300 years before the Chriſtian æra. And this is termed the *third ſtage* of Greek comedy. The comedies of Ariſtophanes, which ſtill remain, err not leſs againſt taſte than againſt decency. But the Greek comedy is ſuppoſed to have been conſiderably refined by Menander and his cotemporaries. Their works, however, were far from perfection, if we can draw any conjecture from their imitator Plautus, who wrote about a century later. Plautus was a writer of genius; and it may be reaſonably ſuppoſed that his copies did not fall much ſhort of the originals, at leaſt in matters that can be faithfully copied; and he ſhews very little art, either in his compositions, or in the conduct of his pieces. With reſpect to the former, his plots are wondrous ſimple, very little varied, and very little intereſting. The ſubject of almoſt every piece is a young man in love with a muſic-girl, deſiring to purchaſe her from the procurer, and employing a favourite ſlave to cheat his father out of the price; and the different ways of accompliſhing the cheat is all the variety we find. In ſome few of his comedies the ſtory riſes to a higher tone, the muſic-girl being diſcovered to be the daughter of a free-man, which removes every obſtruction to a marriage between her and her lover. In the conduct of his pieces there is a miſerable defect of art. Inſtead of unfolding the ſubject in the progreſs of the action, as is done by Terence, and by every modern writer, Plautus introduces a perſon for no other end but to explain the ſtory to the audience. In one of his comedies, a houſehold-god is ſo obliging as not only to unfold the ſubject, but to relate before-hand every particular that is to be repreſented, not excepting the cataſtrophe.

The Roman theatre, from the time of Plautus to that of Terence, made a rapid progreſs. Ariſtoteleſes defined comedy to be “an imitation of light and trivial ſubjects, provoking laughter.” The comedies of Plautus correſpond accurately to that definition: thoſe of Terence riſe to a higher tone.

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Nothing is more evident than the superiority of Terence above Plautus in the art of writing; and, considering that Terence is a later writer, nothing would appear more natural, if they did not copy the same originals. It may be owing to genius that Terence excelled in purity of language, and propriety of dialogue; but how account for his superiority over Plautus in the construction and conduct of a play? It will not certainly be thought, that Plautus would imitate the worst constructed plays, leaving the best to those who should come after him. This difficulty does not seem to have occurred to any of the commentators. Had the works of Menander and of his contemporaries been preserved, they probably would have explained the mystery; which for want of that light will probably remain a mystery for ever.

6
Epopœe.

Homer has for more than 2000 years been held the prince of poets. Such perfection in an author who flourished when arts were far short of maturity, is truly wonderful. The nations engaged in the Trojan war are described by him as in a progress from the shepherd-state to that of agriculture. Frequent mention is made in the *Iliad* of the most eminent men being shepherds. Andromache, in particular, mentions seven of her brethren who were slain by Achilles as they tended their father's flocks and herds. In that state, garments of woollen cloth were used; but the skins of beasts, the original clothing, were still worn as an upper garment: every chief in the *Iliad* appears in that dress. Such indeed was the simplicity of this early period, that a black ewe was promised by each chief to the man who would undertake to be a spy. In times of such simplicity, literature could not be far advanced; and it is a great doubt, whether there was at that time a single poem of the epic kind for Homer to imitate or improve upon. Homer is undoubtedly a wonderful genius, perhaps the greatest that ever existed: his fire, and the boldness of his conceptions, are inimitable. But in that early age, it would fall little short of a real miracle, to find such ripeness of judgment, and correctness of execution, as in modern writers are the fruits of long experience and progressive improvements during the course of many centuries. Accordingly, that Homer is far from being so ripe, or so correct, cannot escape the observation of any reader of taste and discernment. One striking particular is, his digressions without end, which draw our attention from the principal subject. Diomedes, for instance, meeting with Glaucus in the field of battle, and doubting, from his majestic air, whether he might not be an immortal, inquires who he was, declaring that he would not fight with a god. Glaucus lays hold of this very slight opportunity, in the very heat of action, to give a long history of his family. In the mean time, the reader's patience is put to a trial, and his ardour cools. Again, Agamemnon desiring advice how to resist the Trojans, Diomedes springs forward; but, before he offers advice, gives the history of all his progenitors, and of their characters, in a long train. And, after all, what was the sage advice that required such a preface? It was, that Agamemnon should exhort the Greeks to fight bravely. At any rate, was Diomedes so little known, as to make it proper to suspend the action at so critical a juncture, for a genealogical history? There is a third particular, which justly merits censure; and

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that is, an endless number of minute circumstances, especially in the description of battles, where they are most improper. The capital beauty of an epic poem is, the selection of such incidents and circumstances as make a deep impression, keeping out of view every thing low or familiar. An account of a single battle employs the whole fifth book of the *Iliad*, and a great part of the sixth: yet in the whole there is no general action; but unknown warriors, whom we never heard of before, killed at a distance with an arrow or a javelin; and every wound described with anatomical accuracy. The whole seventeenth book is employed in the contest about the dead body of Patroclus, stuffed with minute circumstances, below the dignity of an epic poem. In such scenes the reader is fatigued with endless particulars; and has nothing to support him but the melody of Homer's versification.

Having traced the progress of the fine arts toward maturity, in a summary way, the decline of these arts comes next in order. An art, in its progress toward maturity, is greatly promoted by emulation; and, after arriving at maturity, its downfall is not less promoted by it. It is difficult to judge of perfection but by comparison; and an artist, ambitious to outstrip his predecessors, cannot submit to be an imitator, but must strike out something new, which, in an art advanced to ripeness, seldom fails to be a degeneracy. This cause of the decline of the fine arts may be illustrated by various instances. The perfection of vocal music is to accompany passion, and to enforce sentiment. In ancient Greece, the province of music was well understood; which, being confined within its proper sphere, had an enchanting influence. Harmony at that time was very little cultivated, because it was of very little use; melody reaches the heart, and it is by it chiefly that a sentiment is enforced, or a passion soothed: harmony, on the contrary, reaches the ear only; and it is a matter of undoubted experience, that the most melodious airs admit but of very simple harmony. Artists, in latter times, ignorant why harmony was so little regarded by the ancients, applied themselves seriously to its cultivation; and they have been wonderfully successful. But they have been successful at the expence of melody; which, in modern compositions, generally speaking, is lost amid the blaze of harmony. These compositions tickle the ear by the luxury of complicated sounds, but seldom make any impression on the heart. The Italian opera, in its form, resembles the Greek tragedy, from which it is evidently copied; but very little in substance. In the latter, music being made subservient to sentiment, the dialogue is nervous and sublime: in the former, the whole weight is laid on music; and the dialogue, devoid of sentiment, is weak and spiritless. Restless man knows no golden mean, but will be attempting innovations without end.—By the same ambition, architecture has visibly declined from its perfection. The Ionic was the favourite order when architecture was in its height of glory. The Corinthian order came next; which, in attempting greater perfection, has deviated from the true simplicity of nature: and the deviation is still greater in the Composite order. With respect to literary productions, the first essays of the Romans were very imperfect. We may judge of this from Plautus, whose compositions are abundantly rude, though much admired by

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his cotemporaries, being the best that existed at that time. The exalted spirit of the Romans hurried them on to the grand and beautiful; and literary productions of all kinds were in perfection when Augustus reigned. In attempting still greater perfection, the Roman compositions became a strange jumble of inconsistent parts: they were tumid and pompous; and, at the same time, full of antitheses, conceit, and tinsel wit. Every thing new in the fine arts pleases, though less perfect than what we are accustomed to; and, for that reason, such compositions were generally relished. We see not by what gradual steps writers, after the time of Augustus, deviated from the patterns that were before them; for no book of any moment after that time is preserved, till we come down to Seneca, in whose works nature and simplicity give place to artificial thought and ballad wit. He was a great corrupter of the Roman taste; and after him nothing was relished but brilliant strokes of fancy, with very little regard to sentiment: even Virgil and Cicero made no figure in comparison. Lucan has a forced elevation of thought and style, very difficult to be supported; and, accordingly, he sinks often into puerile reflections; witness his encomium on the river Po, which, says he, would equal the Danube, had it the same number of tributary streams. Quintilian, a writer of true and classical taste, who was protected and encouraged by Vespasian, attempted to stem the tide of false writing. His rhetoric is composed in an elegant style; and his observations contain every delicacy of the critical art. At the same time flourished Tacitus, possessing a more extensive knowledge of the nature of man than any other author, ancient or modern, if Shakspeare be not excepted. His style is original, concise, compact, and comprehensive; and, in what is properly called his *history*, perfectly correct and beautiful. He has been imitated by several, but never equalled by any. Brutus is said to be the last of the Romans for love of liberty: Quintilian and Tacitus may be said to be the last of the Romans for literary genius. Pliny the Younger is no exception: his style is affected, turgid, and full of childish brilliancy. Seneca and Pliny are proper examples of writers who study show more than substance, and who make sense yield to sound. The difference between these authors and those of the Augustan age, resembles the difference between Greek and Italian music. Music, among the Greeks, limited itself to the employment to which it is destined by nature, *viz.* to be the handmaid of sense, to inform, enliven, or sweeten a sentiment. In the Italian opera, the mistress is degraded to be handmaid; and harmony triumphs, with very little regard to sentiment.

Another great cause that precipitates the downfall of every fine art is despotism. The reason is obvious; and there is a dismal example of it in Rome, particularly with regard to eloquence. We learn from a dialogue accounting for the corruption of the Roman eloquence, that in the decline of the art it became fashionable to stuff harangues with impertinent poetical quotations, without any view but ornament merely; and this also was long fashionable in France. It happened unfortunately for the Romans, and for the world, that the fine arts were at their height in Rome, and not much upon the decline in Greece, when despotism put an end to the

republic. Augustus, it is true, retarded their fall, particularly that of literature; it being the politic of his reign to hide despotism, and to give his government an air of freedom. His court was a school of urbanity, where people of genius acquired that delicacy of taste, that elevation of sentiment, and that purity of expression, which characterize the writers of his time. He honoured men of learning, admitted them to his table, and was bountiful to them. It would be painful to follow the decline of the fine arts in Rome to their total extirpation. The tyranny of Tiberius, and of subsequent emperors, broke at last the elevated and independent spirit of the brave Romans, reduced them to abject slavery, and left not a spark of genius. The science of law is the only exception, as it flourished even in the worst of times: the Roman lawyers were a respectable body, and less the object of jealousy than men of power and extensive landed property. Among the Greeks also, a conquered people, the fine arts decayed; but not so rapidly as at Rome; the Greeks, farther removed from the seat of government, being less within the reach of a Roman tyrant. During their depression, they were guilty of the most puerile conceits: witness verses composed in the form of an ax, an egg, wings, and such like. The style of Greek authors, in the reign of the emperor Adrian, is unequal, obscure, stiff, and affected. Lucian is the only exception that may be made.

We need scarce any other cause but despotism, to account for the decline of statuary and painting in Greece. These arts had arrived at their utmost perfection about the time of Alexander the Great; and from that time they declined gradually with the vigour of a free people; for Greece was now enslaved by the Macedonian power. It may in general be observed, that when a nation becomes stationary in that degree of power which it acquires from its constitution and situation, the national spirit subsides, and men of talents become rare. It is still worse with a nation that is sunk below its former power and pre-eminence; and worst of all when it is reduced to slavery. Other causes concurred to accelerate the downfall of the arts mentioned. Greece, in the days of Alexander, was filled with statues of excellent workmanship; and there being little demand for more, the later statuarys were reduced to heads and busts. At last the Romans put a total end both to statuary and painting in Greece, by plundering it of its finest pieces; and the Greeks, exposed to the avarice of the conquerors, bellowed no longer any money on the fine arts.

The decline of the fine arts in Rome is by a * writer of taste and elegance ascribed to a cause different from any above mentioned, a cause that overwhelms mankind as well as the fine arts where-ever it prevails; and that is opulence, joined with its faithful attendants avarice and luxury. "In ancient times (says he), when naked virtue had her admirers, the liberal arts were in their highest vigour; and there was a generous contest among men, that nothing of real and permanent advantage should long remain undiscovered. Democritus extracted the juice of every herb and plant; and, lest the virtue of a single stone or twig should escape him, he consumed a lifetime in experiments. Eudoxus, immersed in the study of astronomy, spent his age upon the top of a mountain. Chrylippus, to stimulate

* Petronius Arbitr.

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stimulate his inventive faculty, thrice purified his genius with hellebore. To turn to the imitative arts: Lyſippus, while labouring on the forms of a single statue, perished from want. Myron, whose powerful hand gave to the brags almost the soul of man, and animals,—at his death found not an heir! Of us of modern times what shall we say? Immersed in drunkenness and debauchery, we want the spirit to cultivate those arts which we possess. We inveigh against the manners of antiquity; we study vice alone; and vice is all we teach. Where now is the art of reasoning? Where astronomy? Where is the right path of wisdom? What man now-a-days is heard in our temples to make a vow for the attainment of eloquence, or for the discovery of the fountain of true philosophy? Nor do we even pray for health of body, or a sound understanding. Once, while he has scarce entered the porch of the temple, devotes a gift in the event of the death of a rich relation; another prays for the discovery of a treasure; a third for a ministerial fortune. The fenate itself, the exemplary preceptor of what is good and laudable, has promised a thousand pounds of gold to the capitol; and, to remove all reproach from the crime of avarice, has offered a bribe to Jupiter himself. How should we wonder that the art of painting has declined, when, in the eyes both of the gods and men, there is more beauty in a mass of gold, than in all the works of Phidias and Apelles.”—In England, the fine arts are far from such perfection as to suffer by opulence. They are in a progress, it is true, toward maturity; but they proceed in a very slow pace.

There is still another cause that never fails to undermine a fine art in a country where it is brought to perfection, abstracting from every one of the causes above mentioned. It is remarked a little above, that nothing is more fatal to an art or to a science than a performance so much superior to all of the kind as to extinguish emulation. This remark is exemplified in the great Newton, who, having surpassed all the ancients, has not left to his countrymen even the faintest hope of rivaling him; and to that cause is attributed the visible decline of mathematics in Great Britain. The same cause would have been fatal to the arts of statuary and painting among the Greeks, even though they had continued a free people. The decay of painting in modern Italy is, probably, owing to the same cause: Michael Angelo, Raphael, Titian, &c. are lofty oaks that bear down young plants in their neighbourhood, and intercept from them the sunshine of emulation. Had the art of painting made a slower progress in Italy, it might have there continued in vigour to this day. Velleius Paterculus says judiciously, “*Ut primo ad consequendos quos priores ducimus accendimur; ita, ubi aut præteriti aut æquari eos posse desperavimus, studium cum spe fenescit; et quod adsequi qui non potest, sequi desinit: præteritum quo in quo eminare non possumus, aliquid in quo uitamur contenti quiriunt.*”

The decline of an art or science proceeding from the foregoing cause, is the most rapid where a strict comparison can be instituted between the works of different masters. The superiority of Newton above every other mathematician can be ascertained with precision; and hence the sudden decline of that science in Great Britain. In Italy a talent for painting continued many

years in vigour, because no painter appeared with such superiority of genius as to carry perfection in every branch of the art. As one surpassed in designing, one in colouring, one in graceful attitudes, there was still scope for emulation. But when at last there was not a single perfectist but what one or other matter had excelled in, from that period the art began to languish. Architecture continued longer in vigour than painting, because the principles of comparison in the former are less precise than in the latter. The artist who could not rival his predecessors in an established mode, fought out a new mode for himself, which, though perhaps less elegant or perfect, was for a time supported by novelty.

Useful arts will never be neglected in a country where there is any police; for every man finds his account in them. Fine arts are more precarious. They are not relished but by persons of taste, who are rare; and such as can spare great sums for supporting them are still more rare. For that reason, they will never flourish in any country, unless patronized by the sovereign, or by men of power and opulence. They merit such patronage, as one of the springs of government: and a capital spring they make, by multiplying amusements, and humanizing manners; upon which account they have always been encouraged by good princes.

General Theory of the Polite Arts. The essence of the polite arts, as before observed, consists in *expression*. The end of all these arts is *pleasure*; whereas the end of the sciences is *instruction and utility*. Some of the polite arts indeed, as eloquence, poetry, and architecture, are frequently applied to objects that are useful, or exercised in matters that are instructive, as we shall show more particularly in their proper place; but in these cases, though the ground-work belongs to those sciences which employ the understanding, yet the expression arises from the inventive faculty. It is a picture that is designed by Minerva, to which the muses add the colouring, and the graces the frame. This union forms therefore the perfection of the art, according to that sententious and well known precept of Horace: *Omne tulit punctum, qui miscuit utile dulci.*

Under the denomination, therefore, of Polite Arts, we comprehend, 1. Eloquence; 2. Poetry; 3. Music; 4. Painting; 5. Sculpture; 6. Graving; 7. Architecture; 8. Declamation; 9. Dancing. Particular descriptions of these arts are given under their respective names. This branch of the present article is intended as a general introduction to them; and, as such, will be occasionally referred to.

There is one very essential reflection, which it appears to us proper to make in the first place, on the polite arts in general. All the rules in the world are not sufficient to make a great poet, an able orator, or an excellent artist; because the quality, necessary to form these, depends on the natural disposition, the fire of genius, which no human art can confer, but which is the pure gift of heaven. The rules, however, will prevent a man from being a bad artist, a dull orator, or a wretched poet; seeing they are the reflections of the greatest masters in those arts, and that they point out the rocks which the artist should shun in the exercise of his talents. They are of use, moreover, in facilitating his labours, and in directing him

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Useful arts
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to arrive by the shortest and surest road to perfection. They refine, strengthen, and confirm, his taste. Nature, abandoned to herself, has constantly something wild and savage. Art, founded on just and sagacious rules, gives her elegance, dignity, and politeness; and it is impossible to sacrifice properly to the graces, without knowing the incense that is pleasing to them.

Beauty is the object of all the polite arts. It is not however so easy, as it may seem, to give a clear and determinate idea of what we precisely mean by that term *. Many able writers, who have treated expressly on the subject, have shewn that they were totally ignorant of what it was. It is one of those expressions that we comprehend immediately, that present us with a clear and precise idea, that leave a distinct impression on our minds, when it is simply written or pronounced; but which philosophers envelope in darkness, when they attempt to elucidate it by definitions and descriptions; and the more, as mankind have different ideas of beauty, the different of signs and tastes being as various as the understandings and physiognomies. We may say however in general, that beauty results from the various perfections of which any object is susceptible, and which it actually possesses; and that the perfections which produce beauty consist principally in the agreeable and delightful proportions which are found, 1. Between the several parts of the same object; 2. Between each part and the whole together; 3. Between the parts and the end or design of the object to which they belong. *Genius*, or invention, is that faculty of the mind by which *beauty* is produced. *Taste* †, disposition, or rather the natural sensation of the mind refined by art, serves to guide the genius in discerning, embracing, and producing, that which is beautiful of every kind. From whence it follows, that the general theory of the polite arts is nothing more than the knowledge of what they contain that is truly beautiful and agreeable; and it is this knowledge, this theory, which modern philosophers call by the Latin name of *aesthetica*.

It should be constantly remembered, that the essence of the polite arts consists in expression. This expression lies sometimes in the words, and sometimes in the pen; sometimes in sounds and their harmony, and at others in corporeal attitudes; sometimes in the pencil or in the chisel, and at others in the graver; sometimes in a proper disposition or judicious employment of the mechanic arts, and at others merely in their manner of acting. From whence arise those arts that we have mentioned, and which are described in their order.

The general theory of the polite arts, or *aesthetics*, necessarily supposes, therefore, certain rules; but these general rules are of no great number. The first is, That whoever would devote himself to the polite arts, should above all things consult his genius; divest himself of all self-love; and examine if he be a true son of Apollo, and cherished by the muses: for

In vain, rash author, dost thou strive to climb,
By lofty verse, Parnassius' height sublime;
If heaven does not by secret powers inspire,
Or if thy natal star darts not poetic fire.

This precept with regard to poetry in particular, is applicable to all the polite arts in general; for their most happy success is founded on *imagination*. By this term we understand, in general, a faculty of the

mind, a particular genius, a lively invention, a certain subtle spirit, which gives a facility in discovering something new. But it is necessary also to prescribe just bounds to this term *new*, which must not be here taken in an absolute sense. Solomon wisely remarks, that, even in his time, *there was nothing new under the sun*. In fact, all that exists, and all that is capable of being discovered in the known world, has already been discovered. The fine arts in their imitations of nature, in their expressions, can borrow images, figures, comparisons, from those things only that exist and are known. As there have been, from the beginning of the world to our days, millions of authors in each of the polite arts, almost all the possible combinations of the various subjects have been produced by their lively imaginations; and when we hear the ignorant part of mankind talk of a work of wit or of art that is *entirely new*, that offers ideas which were before utterly unknown, that had never entered into the brain of any other man, we should refer such assertions to the class of popular errors; and reflect on those stories we every day hear of certain empirics, who pretend to be alone possessed of marvellous methods of cure by means of simples; as if there were any plant, any stalk of grass that grows in our world, that can have escaped the researches of botanists. But the novelty, of which we here speak, consists in the ingenious use of combinations of all the various objects of nature, that are new, happy, and agreeable, that have not yet been exhausted, and which appear even to be inexhaustible; and of the use which the artist makes of all new discoveries, which he turns to his advantage, by a judicious application. Invention therefore supposes a considerable fund of preliminary knowledge, such as is capable of furnishing ideas and images, to form new combinations. But there is no art by which invention itself can be produced; for that, as we have already said, is the gift of heaven; and it is an endowment which we cannot even make use of whenever we please. We would rather say, therefore, that invention consists in producing, in works of genius, that which is *unexpected*; an object, a harmony, a perfection, a thought, an expression, of which we had no idea, that we could not foresee, nor hope to find, where the artist has so happily placed it, and where we perceive it with delight. This idea appears applicable to such of the polite arts as affect the mind by the hearing as well as by the sight; and it is a matter that is highly essential.

The second rule is, That every artist ought incessantly to labour in the improvement of his *taste*; in acquiring that sensible, refined, and clear discernment, by which he will be enabled to distinguish the real beauties in each object, the ornaments that are agreeable to it, and the proportions and relations that subsist among the several parts: and by this faculty, he will be regulated in the employment of his natural talents. This labour consists not only in the profound reflections he will make on the properties of objects as they relate to the fine arts, but also in a constant, assiduous study of the grand models of beauty.

The third rule, to be observed in the practice of the polite arts, is the *imitation of nature*. Every object in the universe has its peculiar nature, of which the artist should never lose sight in his manner of treating it. In

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18
Novelty
and
Invention.

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Beauty, ge-
nius, taste,
what
* See the
article
Beauty

† See Taste.

16
First gen-
eral rule.

17
Imagination,
what.

19
1d Rule,
Improvement
of
taste.

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3d, Imita-
tion of na-
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resembling those of dill; the extremity of the stalk is terminated by a large umbel of white flowers, composed of five unequal petals. These are succeeded by roundish compressed fruit, each having two seeds, whose borders are scaly. 2. The *aculeata*, with prickly seeds, grows upon the African shore on the Mediterranean, as also in Spain. This is also an annual plant, with an upright stalk near three feet high, and puts out many shoots. The leaves are hairy, and greatly resemble those of the common carrot: the stalks are terminated by umbels of large white flowers shaped like those of the former, and are succeeded by a prickly fruit containing two seeds.

Both these plants decay as soon as they perfect their seeds, and often before they are ripe in Britain: for unless the seeds are sown in autumn, and the plants come up before winter, they rarely perfect their seeds here. The seeds should be sown on a warm border where the plants are to remain, for they will not bear transplanting.

ARTEMIDORUS, famous for his *Treatise upon Dreams*. He was born at Ephesus, but took upon him the surname of *Daldianus* in this book, by way of respect to his mother's country Daltis. He styled himself the *Ephesian* in his other performances. He not only bought up all that had been written concerning the explication of dreams, which amounted to many volumes; but he likewise spent many years in travelling, in order to contract an acquaintance with fortune-tellers: he also carried on an extensive correspondence with all the people of this sort in the cities and assemblies of Greece, Italy, and the most populous islands; collecting at the same time all the old dreams, and the events which are said to have followed them. The work which he wrote on dreams consisted of five books: the first three were dedicated to one *Cassius Maximus*; and the last two to his son, whom he took a good deal of pains to instruct in the nature and interpretation of dreams. This work, though filled with frivolous observations, contains some things that are interesting. It was first printed in Greek, at Venice, in 1518; and Rigaltius published an edition at Paris, in Greek and Latin, in 1603, and added some notes. Artemidorus wrote also a treatise upon *Auguries*, and another upon *Chiromancy*; but they are not extant. He lived under the emperor Antoninus Pius.

ARTEMISIA, wife of Mausolus king of Caria, has immortalized herself by the honours which she paid to the memory of her husband. She built for him in Halicarnassus a very magnificent tomb, called the *Mausoleum*, which was one of the seven wonders of the world, and from which the title of *Mausoleum* was afterwards given to all tombs remarkable for their grandeur: but the died of regret and sorrow before the Mausoleum was finished. She appointed panegyrics to be made in honour of him, and proposed a prize of great value for the person who should compose the best. He died about the end of the 106th Olympiad, 351 years before the Christian era.

ARTEMISIA, queen of Caria, and the daughter of Ligdamis, marched in person in the expedition of Xerxes against the Greeks, and performed wonders in the sea-fight near Salamis, 480 years before the Christian era. Being pursued by an Athenian vessel, she attacked one of the Persian ships, commanded by De-

masithymus, king of Calyndus, her enemy, and sunk it; on which the Athenians, thinking that her ship was on the side of the Greeks, ceased their pursuit: but Xerxes was the principal person imposed upon in this affair; for believing the dead sunk an Athenian vessel, he declared, that "the men had behaved like women, and the women like men." Xerxes intrusted her with the care of the young princes of Persia, his sons; when, agreeably to her advice, he abandoned Greece, in order to return to Asia. These great qualities did not secure her from the weakness of love: she was passionately fond of a man of Abydos, whose name was Dardanus, and was so enraged at his neglect of her, that she put out his eyes while he was asleep. The gods, in order to punish her for this, inspired her with still a stronger passion for him; so that the oracle having advised her to go to Leucas, which was the usage of desperate lovers, she took the leap from thence, and was interred at that place.—Many writers confound this Artemisia with the former, the wife of Mausolus.

ARTEMISIA, (so called, according to some, from Artemisia, wife of Mausolus king of Caria, who brought this plant into use, whereas, before, it was called *Parthenia*, the virgin goddess being said to have given name to it), *Mugwort*, a genus of the polygamia superflua order, belonging to the syngenesia class of plants.

Species. Of this genus there are upwards of 20 species enumerated by botanical writers; but those most worthy of notice are the following. 1. The vulgaris, or common mugwort. This grows naturally on banks and by the side of foot-paths in many parts of Britain, so is seldom admitted into gardens, where it would prove a troublesome weed, as it spreads very fast by its creeping roots. It flowers in June, at which time the plant is ready for use. 2. The *dracunculus*, or taragon, which is frequently used in salads, especially by the French. It is a very hardy plant, and spreads greatly by its creeping roots. 3. The *abrotanum*, or southernwood, which is kept in gardens for the sake of its agreeable scent. It is a low shrub, seldom rising more than three or four feet high, sending out lateral shrubby branches, growing erect, garnished with five bristly leaves, having an agreeable scent when bruised: the flowers are produced in spikes from the extremity of the branches; but unless the autumn proves warm, they seldom open in England. 4. The *fantonium*, which produces the *femen fantonium*, which is much used for worms in children. It grows naturally in Persia, from whence the seeds are brought to Europe. It hath the appearance of our wild mugwort; the branches are slender, erect, and garnished with linear winged leaves, and terminated by recurved slender spikes of flowers which have naked receptacles. 5. The *artemisia maritima*, or sea-wormwood, grows naturally on the sea-coasts in moist parts of Britain, where there are several varieties, if not distinct species, to be found. These are low under shrubs, most of which creep at the root, by which they multiply greatly in their natural situation, but when transplanted into gardens seldom thrive so well. 6. The *pontica*, or pontic wormwood, commonly called *Roman wormwood*, is a low herbaceous plant, whose stalks die in autumn, and new ones appear in the spring. These are garnished with finely divided leaves, whose under-sides are woolly;

Artemisia,
Artemisium

woolly; and the upper part of the stalks are furnished with globular flowers which nod on one side, having naked receptacles. These appear in August, but are rarely succeeded by seeds in Britain. 7. The absinthium, or common wormwood, grows naturally in lanes and uncultivated places, and is too well known to require any particular description. 8. The arborescens, or tree-wormwood, grows naturally in Italy and the Levant near the sea. It rises, with a woody stalk, six or seven feet high, sending out many ligneous branches, garnished with leaves somewhat like those of the common wormwood, but more finely divided, and much whiter. The branches are terminated by spikes of globular flowers in the autumn, which are seldom succeeded by seeds in this country.

Culture. The southernwood is propagated by slips or cuttings planted in a shady border about the beginning of April, observing to water them duly in dry weather. In this border they may remain till the following autumn, when they should be transplanted, either into pots, or those parts of the garden where they are to remain. The fantonicum is likewise propagated by slips; but the plants should be placed in a dry soil and sheltered situation, where they will endure the cold of our ordinary winters pretty well; but it will be proper to have a plant or two in pots, which may be sheltered under a common hot-bed frame in winter, to preserve the species. The true wormwood is easily propagated in the same manner. The cuttings must be planted in a shady border, and duly watered during the summer season, in which case they will take root freely. In autumn, some of the young plants should be potted, that they may be sheltered in winter; the others may be planted in a warm border, where they will live, provided the winter proves favourable. The other sorts spread by their creeping roots; and require no culture, as they are very hardy, and will thrive anywhere.

Medicinal Uses. The moxa, so famous in the eastern countries for curing the gout by burning it on the part affected, is the lanugo or down growing on the under side of the leaves of a species of mugwort, supposed to be the same with our common sort. From some dried samples of this plant, which have been brought over to this country, Mr Miller reckons them to be the same, differing only in size; in which the East Indian kind is inferior to ours. He supposes that the lanugo of our mugwort would be equally efficacious. The seeds of the fantonicum are small, light, chaffy, composed as it were of a number of thin membranous coats, of a yellowish colour, an unpleasant smell, and a very bitter taste. These seeds are celebrated for antelmintic virtues (which they have in common with other bitters), and are sometimes taken in this intention, either along with melleasses, or candied with sugar. They are not very often met with genuine in the shops. The leaves of the sea, common, and Roman wormwoods are used as stomachics, but are all very disagreeable; the Roman is the least so, and therefore is to be preferred; but the other two kinds are generally substituted in its place. The distilled oil of wormwood is sometimes made use of to rub on the belly as a cure for worms.

ARTEMISIUM, either a promontory, (Harpocraton), or a part of the sea-coast, on the north-east

of Eubœa, (Plutarch); called *Leon*, and *Cale Ade*, (Ptolemy); memorable for the first sea-engagement between the Greeks and Xerxes.—Another promontory of Caria, (Strabo).—A third in Spain, now called *Cape Martin*, in Valencia: in the meridian of London, and Lat. 38. 50.

ARTEMISIUM, a town of Oenotria, (Stephanus): now *S. Agatha*, in the Hither Calabria, on the river Pisaurus, or la Foglia, distant eight miles from the Tuscan Sea.—Another of the Contestani, in Spain, (Strabo); otherwise called *Dianium*: now *Denia*, on the sea-coast of Valencia. W. Long. 20. Lat. 39.

ARTERIOTOMY, the opening an artery, with design to procure an evacuation of blood.

ARTERY, in anatomy, a conical tube or canal which conveys the blood from the heart to all parts of the body. See ANATOMY, n° 381.—389.

ARTHRITIS, in medicine, the gout. See the *Index* subjoined to MEDICINE.

ARTHRODIA, in natural history, a genus of imperfect crystals, found always in complex masses, and forming long single pyramids, with very short and slender columns.

ARTHRODIA, in anatomy, a species of articulation, wherein the flat head of one bone is received into a shallow socket in the other. The humerus and scapula are joined by this species of articulation.

ARTHUR, king of the Britons, of whom scarcely any thing can be certainly affirmed. He is said to have been the son of Uther Pendragon king of Britain, and to have been born in 501. His life is a continued scene of wonders. It is said that he killed four hundred and seventy Saxons with his own hand in one battle; and after having subdued many mighty nations, and instituted the order of the Knights of the Round Table, died A. D. 542.

ARTICHOAK, in botany. See CINARA.

ARTICLE, a clause or condition of a contract, treaty, &c. It is also a small part or division of a discourse, book, or writing, &c.

ARTICLE of Death, the last pangs or agony of one just expiring.

ARTICLE, in grammar. See there n° 61.

ARTICLES of Religion, in the church of England. In the beginnings of Christianity, the declaration that was required of a Christian's faith was conceived in very general terms; but, as heresies sprung up, it was found necessary to guard against them, by enlarging the creeds or confessions of faith. It was in imitation of this procedure that the reformers were so copious in stating the doctrines of the church of England in that work which is intitled, "Articles whereupon it was agreed by Archbishops and Bishops of both provinces, and the whole Clergie, in the convocation holden at London, in the year of our Lorde God 1562, according to the computation of the Church of England, for the avoiding of the diversities of opinions, and for the stablishing of consent touching true religion." There were two particular circumstances in that time which made this seem to be the more necessary: the one was, that there sprung up, together with the reformation, many impious and extravagant sects; the other, that, having but just got rid of Popery, it was absolutely necessary to take the utmost precautions against it for the future. These articles were

Artemisium
Articles.

Articulate
Artificial.

prepared, as is most probable, by the bishops Cranmer and Ridley, and were published by royal authority. The most authentic manuscript of them is in the library of Corpus Christi college in Cambridge. It belonged to Archbishop Parker, and was left by him to that college.

The subscription to these articles is enjoined by statute, which establishes them, and requires every clergyman to declare his assent, and subscribe them in the presence of his ordinary. The form of the subscription is not prescribed by the statute; but by the canon it is expressly required, that he acknowledge them, and every one of them, to be agreeable to the word of God. There is a clause in the statute, which subjects every minister, who maintains any doctrine repugnant to these articles, to deprivation.

ARTICULATE SOUNDS are such sounds as express the letters, syllables, or words, of any alphabet or language: such are formed by the human voice, and by some few birds, as parrots, &c.

ARTICULATION, or JOINTING, is the joining of bones together; and is of two kinds, viz. *articulation and connection*. **ARTICULATION** is of two kinds, 1. *Diarthrosis*, which is capable of motion. 2. *Synarthrosis*, which is not capable of motion. There is a species composed of these two, which some call *amphiarthrosis*. **CONNECTION, or symphysis**, is of three kinds: 1. By ligament, called *syneurosis*, or *syndesmosis*. 2. By cartilages, called *synchondrosis*. 3. By uncles passing from one bone to another, called *sisarcosis*.

ARTICULATION, in botany, is the connection of parts that consist of joints or knees, such as the pods of French honey-suckles, which when ripe divide into so many parts as there are knees or joints; also those parts of plants which swell into nodes or joints, and which usually send forth branches.

ARTIFICER, a person whose employment it is to manufacture any kind of commodity, as in iron, brass, wool, &c. such are smiths, braziers, weavers, &c. By the law of England, if artificers or workmen conspire not to work under certain prices, they are liable to certain penalties by statute 2 and 3 Edw. VI. c. 15. A stranger, *artificer* in London, is not allowed to keep above two strangers servants, but he may have as many English servants and apprentices as he can get, (statute 81 Henry VIII. c. 16.) And, to prevent the destruction of our home manufactures, by transporting and seducing our artils to settle abroad, it is provided by statute 5 Geo. I. c. 27. that such as fo entice or seduce them shall be fined 100l. and be imprisoned three months; and for the second offence shall be fined at discretion, and be imprisoned a year: and the artificers, so going into foreign countries, and not returning within six months after warning given them by the British ambassador where they reside, shall be deemed aliens, shall forfeit all their lands and goods, and shall be incapable of any legacy or gift. By statute 23 Geo. II. c. 13. the seducers incur, for the first offence, a forfeiture of 500l. for each artificer contracted with to be sent abroad, and imprisonment for twelve months; and for the second, 1000l. and are liable to two years imprisonment.

ARTIFICIAL, in a general sense, denotes something made, fashioned, or produced by art, in contradistinction from the productions of nature.

Artif.
Artillery.

ARTIGI, indeclinable, (Pliny); *Artigis*, (Ptolemy); a town of the Turduli, in Bætica. Now *Albama*. See **ALHAMA**.

ARTILLERY, in its most limited sense, signifies fire-arms, mounted on their carriages and ready for action, with their balls, their bombs, their grenades, &c.

If we take the term in a more extensive meaning, it includes the powder, the matches, instruments for fire-works, the utensils of ordnance, the machines which facilitate their motion and transport them, the vehicles over which they traverse rivers, every thing necessary to them, and all that enters into the form of a train of artillery.

The same word, still farther extended in its meaning, likewise comprehends the men destined for the service of the *artillery*; the people who provide the artillery with materials and implements when engaged, the cannoniers, the bombardiers, the officers of every rank, and engineers of every kind.

By *artillery* is likewise understood the science which the officers of artillery ought to possess. This science teaches to know the nature of all the materials and ingredients which enter into the composition and the structure of every thing relative to the artillery: such as, nitre, sulphur, charcoal; the properties of air and fire; the composition and preparation of gun-powder; the materials for fire-works; the construction, proportions, &c. of the different warlike machines; the arrangement, movement, and whole management, of cannon, &c. in the field or in sieges, in such a manner, that each of them, according to the length of its tube and the diameter of its bore, may be situated in the best place and at the properest distance for execution, and that the whole train taken together may reciprocally assist and support each other with the greatest advantage.

Artillery, taken in its most limited acceptation, has undergone many changes from its origin to the present time. The artillery of the ancients were the catapults, the ballistæ, the different kinds of slings, &c. The chevalier Folard was extremely attached to these ancient machines, and seemed even to prefer them to our fire-arms: an opinion which must appear not a little extraordinary, from such a person. Father Daniel might well be mistaken in the comparison which he made between the effects of ancient and modern artillery, and in his conclusion that the latter was of little use: the situation of this good father removed him from the scenes of war, and the opportunities of military experience. But it is astonishing, that one so learned in the military art as the commentator of Polybius, who had ocular demonstration of the success of modern artillery, should have declared so violently against it. Whatever be the case with these authors and their maxims, it may be asserted, that cannon is one of the most singular discoveries which have been made amongst men; and by little and little it has changed the whole art of war, and of consequence influenced the whole system of policy, in Europe. The era of artillery is dated from the battle of Cressy in 1346, because it is only from that day that cannons were mentioned in battle. Edward III. of England successfully employed some pieces of artillery placed in the front of his army. The invention of artillery was then known in France as well as in England; but probably Phi-

Artillery,
Artist.

lip VI. marched with so much hurry and precipitation to attack his enemy, that he left his cannon as useless incumbrances behind him. The ignorance of that age in mechanical arts considerably retarded the progress of artillery; and that of which they were then possessed was so unwieldy and imperfect, that they could not possibly discern its importance and efficacy in practice. Even to the present period, they never have ceased, nor ever will cease, to labour for the improvement of these ignominious machines that mock the thunder, which, though they seem to be invented for the destruction of the human race, and the subversion of empires, have yet by their effects rendered war less savage and less sanguine; political alliances have been more successfully conciliated among all nations, conquests are become less frequent and less rapid, and successes in war have been more easily reduced to calculation.

Figueria, in his embassy in 1518, relates, that the Persians would neither make use of infantry, nor of artillery, because by them the impetuosity of attack and the facility of retreat were equally incumbered and retarded: in these expedients alone their address and their glory consisted. This method of advancing and recalling is widely different from the present conduct of war, as the artillery in armies is now prodigiously multiplied, and must be transported to every place where any body of troops whatever is destined to operate.

The length and diameter of cannon has been much diminished, which must likewise proportionably diminish their weight. It is by long practice and experience that they have discovered how much might be deduced from their magnitude in both these respects with propriety, without hurting the grand effects which, on some occasions, it is necessary they should produce, by rendering them more easy to be wielded, which was the advantage pursued by lessening their size *.

ARTILLERY-Park, the place in the rear of both lines in the army, for encamping the artillery, which is drawn up in lines, of which one is formed by the guns; the ammunition-waggons make two or three lines, 60 paces behind the guns, and 30 distant from one another; the pontoons and tumbrils make the last line. The whole is surrounded with a rope which forms the park: the gunners and matrosses encamp on the flanks; and the bombardiers, pontoon-men, and artificers, in the rear.

ARTILLERY-Train, a certain number of pieces of ordnance mounted on carriages, with all their furniture fit for marching.

ARTILLERY-Company, a band of infantry, consisting of 600 men, making part of the militia or city-guard of London.

ARTIST, in a general sense, a person skilled in some art; or, to give Mr Harris's definition, an artist is "A person possessing an habitual power of becoming the cause of some effect, according to a system of various and well-approved precepts." See ART.

We are told * of a privilege granted at Vicenza to artists, like that of *clergy* in England: in virtue thereof, criminals adjudged to death save their lives if they can prove themselves the most excellent and consummate workmen in any useful art. This benefit is allowed them *in fauorem artis*, for the first offence, except in some particular crimes, of which coining is one; for

here the greater the artist, the more dangerous the person.

ARTIST, (*Artista*), in an academical sense, denotes a philosopher or proficient in the faculty of arts.

In the early ages of universities, the seven liberal arts completed the whole course of study, or philosophy, as it was called: whence the masters of this faculty were denominated *Artists*. What they understood by the liberal arts used to be summed up in the following Latin verse:

Lingua, Tropus, Ratio, Numerus, Tonus, Angulus, Astrum.

ARTIST is more peculiarly used, by Paracelsus and other adepts, for a chemist or alchemist.—We find frequent mention, in authors of this class, of Elias Artista, or Elias the artist, who is to come some time before the dissolution of the world, and restore and make perfect all arts and sciences, but especially the gold-making art; and usher in a truly golden age, or millennium. The lower and meaner things in this sublime art, Paracelsus observes, God has permitted to be already discovered; but for the greater and more important matters, as the transmutation of other metals into gold, they are reserved to the coming of Elias the artist.

ARTOBRIGA, a town of Vindelicia, (Ptolemy); now *Altzburg*, in Bavaria, on the Danube, below Ingolstadt, (Aventinus); but Cluverius supposes it to be *Lebenau*, on the Saltzbach, below Lauffen, in the archbishoprick of Saltzburg.

ARTOIS, a province of France, and one of the finest and most fertile in the whole kingdom; formerly it was one of the 17 provinces of the Netherlands, but now belongs entirely to France. The names of Artois, and Arras, its capital, are derived from the Atrebatæ, a people of Gallia Belgica, mentioned by Julius Cæsar. Its greatest length from north to south is about 24 leagues, and its breadth about 12, being bounded to the south and west by Picardy, to the east by Hainault, and to the north by Flanders. A considerable trade is carried on in the province in grain, flax, hops, wool, and linen cloth. The states, who meet regularly once a year, consist of the clergy, nobility, and commoners; and sit generally a fortnight at Arras: their chief business is to deliberate on the ways and means to raise the money which the king demands of them, and which usually amounts to about 400,000 livres, exclusive of forage-money. The most considerable places in Artois are, Arras the capital, Bapaume, Bethune, St Venant, and St Omer. See these articles.

ARTOTYRITES, a Christian sect, in the primitive church, who celebrated the eucharist with bread and cheese, saying, that the first oblations of men were of the fruits of the earth, and of sheep. The word is derived from *agros*, bread, and *tyros*, cheese.

The Artotyrites admitted women to the priesthood and episcopacy; and Epiphanius tells us, it was a common thing to see seven girls at once enter into their church, robed in white, and holding a torch in their hand; where they wept, and bewailed the wretchedness of human nature, and the miseries of this life.

ARVALES FRATRES, in Roman antiquity, a college of 12 priests, instituted by Romulus, and chosen out of the most noble families, himself being one of that body; they assisted in the sacrifices of the ambarvalia, annually offered to Ceres and Bacchus, for the pro-

Artist
Arvales.

* See further the articles
Gunnery and
Projectiles.

* Evelyn's Discourse of
Medals,
p. 237, &c.

Aruba
Arum.

Arum.

prosperity of the fruits of the earth; when they wore on their heads crowns made of ears of corn.—The original of this institution was as follows: Acca Laurentia, Romulus's nurse, was accustom'd once a-year to make a solemn sacrifice for a blessing on the fields, her 12 sons always assisting her in the solemnity; but at last losing one of her sons, Romulus offered himself to supply his place, and gave this small society the name of *Arvales fratres*. This order was in great repute at Rome: they held the dignity for life, and never lost it upon account of imprisonment, banishment, or any other accident.

ARUBA, a small island on the coast of Terra Firma, subject to the Dutch, and situated in W. Long. 69. 30. N. Lat. 12. 30.

ARUCCI, a town of Bætica, in the Conventus Hispalensis, (Pliny); now *Moron*, in Andalusia, from an ancient inscription; five leagues to the west of Osuna. W. Long. 5. 20. Lat. 37°.

ARVERNI, an appellation early used for the capital of the Arverni, according to the custom of the latter ages of naming towns from the people; it was formerly called *Nemofus*, (Strabo). The *Arverni*, a brave and ancient people, and one of the most powerful nations of Gaul, claimed affinity with the Romans, as descendants from Antenor, (Lucan): and after their conquest by the Romans, their ancient liberty was preserved to them, on account of their bravery, (Pliny). Above 1000 years ago the town was called *Clarus Mons*, from its situation, (Valehus). *Near Clermont*, in Auvergne. E. Long. 3. 20. N. Lat. 45. 42.

ARVIL-SUPPER, a feast or entertainment made at funerals, in the north part of England. Arvil-bread is the bread delivered to the poor at funeral solemnities; and *arvil*, *arval*, *arful*, are used for the burial or funeral rites; as,

Come, bring my jekin, Tibb, I'll to the *arvil*,
Yon man's dea leuy foun, it makes me *marvil*.

Torkb. Dial. p. 58.

ARVIRAGUS, an ancient British king who flourished in the time of the emperor Domitian. He gained a complete victory over Claudius; but being soon after besieged in the city of Winchester, he made a treaty with the Romans, and married the emperor's daughter Genufia. This monarch lived to a good old age; he confirmed the ancient laws, enacted new ones, and liberally rewarded persons of merit.

ARUM, WAKEROBIN, or CUCKOW-FINT; a genus of the polyanthia order, belonging to the gynandria class of plants.

Species. Of this genus there are 22 species, of which the most remarkable are the following. 1. The maculatum, or common wakerobin, grows naturally in woods and on shady banks in moist parts of Britain. The leaves are halberd-shaped, very entire, and spotted; the berries numerous, growing in a naked cluster. The flowers appear in April; and their wonderful structure hath given rise to many disputes among the botanists. The receptacle is long, in the shape of a club, with the seed-buds surrounding its base. The chives are fixed to the receptacle amongst the seed-buds, so that there is no occasion for the tips to be supported upon threads, and therefore they have none; but they are fixed to the fruit-stalk, and placed between two rows of tendrils: the point in dispute is, what is the

use of those tendrils. 2. The proboscideum. 3. The arisarum. 4. The tenuifolium. These three species have usually been separated from this genus, and distinguished by the general name of *arisarum*, or *frisar's cowls*, on account of the resemblance of their flowers to the shape of the cowls worn by friars. The flowers appear in April. 5. The italicum, is a native of Italy, Spain, and Portugal. The leaves rise a foot and an half high, terminating in a point; they are very large, and finely veined with white, interspersed with black spots, which, together with the fine shining green, make a pretty variety. The flowers grow near a foot high; and have very long upright spathas, which are of a pale green. They appear in the end of April, or beginning of May. 6. The dracunculus, or common dragon, grows naturally in most of the southern parts of Europe. It hath a straight stalk three or four feet high, which is spotted like the belly of a snake: at the top it is spread out into leaves, which are cut into several narrow segments almost to the bottom, and are spread open like a hand; at the top of the stalk the flower is produced, which is in shape like the common arum, having a long spatula of a dark purple colour, standing erect, with a large pistil of the same colour, so that when it is in flower it makes no unpleasant appearance; but the flower hath so strong a scent of carrion, that few people can endure it, for which reason it hath been banished most gardens. 7. The trilobatum, or arum of Ceylon, is a native of that island and some other parts of India; so is very impatient of cold. It is a low plant; the flower rises immediately from the root, standing on a very short footstalk: the spatula is long, erect, and of a fine scarlet colour, as is also the pistil. 8. The colocasia. 9. The divaricatum, with spear-shaped leaves. 10. The perogrimum, or elder. 11. The esculentum, or eatable arum. 12. The sagittifolium, or greatest Egyptian arum. All these species have mild roots, which are eaten by the inhabitants of the hot countries, where they grow naturally; and some of them are cultivated by the inhabitants of the sugar colonies, where their roots are constantly eaten, as also the leaves of some of them, particularly those of the esculentum, which they call *Indian kale*; and which, in those countries where many of the esculent vegetables of England are with difficulty produced, proves a good succedaneum. 13. The arborescens, or dumb cane, is a native of the sugar islands, and warm parts of America, where it grows chiefly on low grounds. All the parts of it abound with an acrid juice; so that, if a leaf or part of the stalk is broken, and applied to the tip of the tongue, it occasions a very painful sensation, and great defluxion of saliva. The stalks of this plant are sometimes applied to the mouths of the negroes by way of punishment.

Culture. All the species of this plant are hardy, except that of Ceylon, and the arborescens. The Ceylon arum must be kept constantly in a stove, and the last in a moderate hot-bed. The arborescens is propagated by cutting off the stalks into lengths of three or four joints, which must be left to dry six weeks or two months; for if the wounded part is not perfectly healed over before the cuttings are planted, they will rot and decay. They are then to be planted in small pots filled with light sandy earth, and plunged in a moderate hot-bed of tan, observing to let them have little

water

water till they have taken good root.

Medicinal Uses. The roots of the maculatum and dracunculus are used in medicine, and differ in nothing but that the latter is somewhat stronger than the former. All the parts of the arum, particularly the root, have an extremely pungent, acrimonious taste; if the root be but lightly chewed, it continues to burn and vellicate the tongue for some hours, occasioning at the same time a considerable thirst; these symptoms are alleviated by butter, milk, or oily liquors. Dried and kept for some time, it loses much of its acrimony, and becomes at length an almost insipid farinaceous substance.

This root is a powerful stimulant and attenuant. It is reckoned a medicine of great efficacy in some cachectic and chlorotic cases, in weaknesses of the stomach occasioned by a load of viscid phlegm, and in such disorders in general as proceed from a cold sluggish indispotion of the solids and lentor of the fluids.

ARUNDA, a town of Hispania Bætica, on the Annas, or Guadiana, (Ptolemy, Pliny): Now said to be *Ronda*, in the province of Granada, on the confines of Andalusia. W. Long. 5. 40. Lat. 36. 26.

ARUNDEL (Thomas), archbishop of Canterbury in the reigns of Richard II. Henry IV. and Henry V. He was the second son of Robert earl of Arundel and Warren, and brother of Richard earl of Arundel who was beheaded. At 22 years of age, from being archdeacon of Taunton he was raised to the bishopric of Ely, the 6th of April, 1375, in the reign of Edward III. He was a great benefactor to the church and palace of this see; among other donations he gave a curious table of massy gold, adorned with precious stones, which had been given to prince Edward by the king of Spain, and sold by the latter to bishop Arundel. In 1386, he was appointed lord chancellor of England; two years after, he was translated to the see of York; and, in 1396, was advanced to the archiepiscopal see of Canterbury, when he resigned the chancellorship. This was the first instance of the translation of an archbishop of York to the see of Canterbury. Scarce was he fixed in this see, when he had a contest with the university of Oxford, about the right of visitation. The affair was referred to king Richard, who determined it in favour of the archbishop. At his visitation in London, he revived an old constitution, by which the inhabitants of the respective parishes were obliged to pay to their rector one halfpenny in the pound out of the rent of their houses. In the second year of his translation, a parliament being held at London, the commons with the king's leave impeached the archbishop, together with his brother the earl of Arundel, and the duke of Gloucester, of high treason. The archbishop was sentenced to be banished, and within forty days to depart the kingdom on pain of death. He retired first to France; and then to the court of Rome, where pope Boniface IX. gave him a kind reception. About this time, the duke of Lancaster (afterwards Henry IV.) was in France, having been banished by king Richard. The nobility and others, tired with the oppressions of Richard, solicited the duke to take the crown; this their request they drew up in a letter, and sent it over by faithful messengers to archbishop Arundel, desiring him to be their advocate on this occasion with the duke. The archbishop, being a

fellow-sufferer, gladly accepted the office; and went with the messengers to the duke at Paris, where they delivered the letters from the nobles and commons of England, and the archbishop seconded them with the best arguments he could invent. The inviting offer, after some objections which were easily obviated, the duke accepted; and upon his accession to the throne, Arundel, who had returned with him to England, was restored to his see. In the first year of this prince's reign, Arundel summoned a synod which sat at St Paul's. The next year the commons moved that the revenues of the church might be applied to the service of the public; but Arundel opposed the motion with such vigour, that it was thrown aside. In the year 1408, Arundel began to exert himself against the Lollards, or Wickliffites; and his zeal for suppressing that sect carried him to several unjustifiable severities against the heads of it, particularly against Sir John Oldcastle and Lord Cobham. He also procured a synodical constitution, which forbade the translation of the Scriptures into the vulgar tongue. This prelate died at Canterbury, Feb. 20th, 1413, of an inflammation in his throat, with which he was seized (as it is pretended) whilst he was pronouncing sentence upon Lord Cobham. The Lollards asserted this to be a judgement from God; and indeed bishop Goodwin speaks in the same manner, saying, "He who had with-held from the people the word of God, the food of the soul, by the just judgement of God had his throat so closed, that he could not speak a single word, nor swallow meat or drink, and was so starved to death." He was buried in the cathedral church of Canterbury, near the west end, under a monument erected by himself in his lifetime. To this church he was a considerable benefactor: for he built the lantern-tower and great part of the nave; gave a ring of five bells, called from him *Arundel's ring*; several rich vestments, a mitre encased with jewels, a silver gilt crozier, and two golden chalice.

ARUNDEL (Thomas), earl of Arundel and Surrey, lord marshal of England, who sent William Petty into Asia, to search for some curious monuments of antiquity, where he bought those which we call the *Arundel marbles*, of a Turk, who had taken them from a learned man sent by the famous Piersq into Greece and Asia upon the same design. These curious marbles were placed in the earl's house and gardens, upon the banks of the Thames, and afterwards entrusted to the care of the university of Oxford, where they now are. This chronology, engraved 264 years before the Christian era, serves to rectify the dates of a great many events of the ancient history of Greece. The great Selden wrote a book of their contents, 1629. They have since been published by Dr Prideaux, 1676, at Oxford; and again, at London, 1732, with commentaries, and an index, by Maittaire. The reader will meet with a correct Latin and English translation of these marbles, in *The Chronological tables of universal history*, by the learned abbe Lenglet Dufresnoy, lately translated into English.

ARUNDEL, a borough and market town in Sussex, seated on the north-west side of the river Arun, over which there is a bridge. It had a harbour, wherein a ship of 100 tun burthen might ride; but the sea had ruined it so far, that, in 1733, an act passed for repairing it, and for erecting new piers, locks, &c. The

cañle,

Arundo.
Aruspices.

castle, which gives the title of earl to its possessors, is seated on the east of the Tame, and is reputed to be a mile in compass. It sends two members to parliament; and is 55 miles south-west by south of London, and ten miles east of Chichester. W. Long. o. 25. N. Lat. 50. 45.

ARUNDO, the REED; a genus of the digynia order, belonging to the triandria class of plants.

Species. Of this genus there are six species. 1. The phragmites, or common marsh-reed, which grows by the sides of rivers and in standing waters. 2. The denax, or manured reed. This is a native of warm countries, but will bear the cold of our moderate winters in the open air. It dies to the surface in autumn, but appears again in the spring, and, if kept supplied with water, will grow 10 or 12 feet high in one summer. The stalks of this are brought from Spain and Portugal; and are used by the weavers, as also for making fishing-rods. 3. The variegated, or Indian variegated reed, is supposed to be a variety of the second, differing from it only in having variegated leaves. 4. The bambosa, or bamboo *, is a native of the East Indies and some parts of America. Some of these plants, when kept in stoves, in this country arise to the height of 20 feet; and, were the stoves high enough to admit them, they would in appearance rise to double that height. Some of these stems are as large as a man's wrist; but in general are as big as walking-sticks, for which purpose they are as fit as those that are imported from India *. 5. The arborea, with a tree-like stalk, differs from the former only in having narrower leaves. 6. The orientalis is what the Turks use as writing-pens; it grows in a valley near mount Athos, as also on the banks of the river Jordan. None of these plants are at present to be found in Britain.

Culture. As all these plants grow naturally in low marshy lands, they must be supplied with plenty of water. The second kind requires little care; the third is more delicate, and requires to be kept in pots. The fourth, fifth, and sixth sorts must be preserved in stoves. They are to be planted in tubs filled with rich earth, and plentifully supplied with water. When the tubs decay, they may be suffered to grow into the tan, which will encourage them to grow to a larger size: but care must be taken, when the bed is refreshed with new tan, to leave a sufficient quantity of old tan about the roots of the plants; for if they are too much bared and the new tan laid near them, when that heats, it will scorch their roots, so that the plants are sometimes destroyed by it.

ARUNDO SACCHARIFERA, or Sugar-cane. See SACCHARUM.

ARUSINI CAMPI, plains in Lucania, famous for the last battle fought between the Romans and Pyrrhus, and the total defeat of the latter, (Florus, Frontinus).

ARUSPICES, or HARUSPICES, in Roman antiquity, an order of priests who pretended to foretell future events by inspecting the entrails of victims killed in sacrifice; they were also consulted on occasion of portents and prodigies. The haruspices were always chosen from the best families; and as their employment was of the same nature as that of the augurs, they were as much honoured. Their college, as well as

those of the other religious orders, had its particular registers and records.

ARX BRITANNICA, a citadel of Batavia, whose foundation is seen at low water, near the old mouth of the middle Rhine: some imagine it the Pharos, or high tower of Caligula, as Suetonius calls it; a monument of Caligula's sham conquest of Britain. Others, that it was built by Drusus, with an altar afterwards by Claudius, on his expedition into Britain. But the usual passage was from Gessoriacum; and Suetonius expressly says, Claudius passed over thence. The ancient name of this citadel, now covered by the sea, is no where expressed: now commonly called 't Huit Britten, or Brittenburg; that is, *Arx Britannica*; but from what authority does not appear.

ARYTENOIDES, in anatomy, the name of two cartilages which, together with others, constitute the head of the larynx. It is also applied to some muscles of the larynx.

ARYTHMUS, in medicine, the want of a just modulation in the pulse. It is opposed to *eurythmus*, a pulse modulated agreeably to nature.

ARZERUM, or ERZERUM. See THEODOSIOPOLIS.

ARZILLA, a very ancient maritime town of Africa, in the kingdom of Fez. Alphonso king of Portugal took it by assault, and brought away the presumptive heir of the crown. After that prince came to the throne, he besieged it, in 1508, with 100,000 men; but was obliged to abandon the undertaking. However, at length the Portuguese forsook it of their own accord. W. Long. 5. 30. N. Lat. 35. 30.

AS, in antiquity, a particular weight, consisting of 12 ounces; being the same with *libra*, or the Roman pound. The word is derived from the Greek *ασ*, which in the Doric dialect is used for *ας*, *one*, q. d. an entire thing; though others will have it named *as* quasi *as*, because made of brass.

As was also the name of a Roman coin, which was of different weights and different matter in different ages of the commonwealth.—Under Numa Pompilius, according to Eusebius, the Roman money was either of wood, leather, or shells. In the time of Tullus Hostilius, it was of brass; and called *as*, *libra*, *libella*, or *pondo*, because actually weighing a pound or 12 ounces. Four hundred and twenty years after, the first Punic war having exhausted the treasury, they reduced the *as* to two ounces. In the second Punic war, Hannibal pressing very hard upon them, they reduced the *as* to half its weight, viz. to one ounce. And lastly, by the Papirian law, they took away half an ounce more, and consequently reduced the *as* to the diminutive weight of half an ounce: and it is generally thought that it continued the same during the commonwealth, and even till the reign of Vespasian. The *as* therefore was of four different weights in the commonwealth. Its original stamp was that of a sheep, ox, or fow: but from the time of the emperors, it had on one side a Janus with two faces, and on the reverse the rostrum or prow of a ship.

As was also used to denote any integer or whole. Whence the English word *ace*.—Thus *as* signified the whole inheritance; whence *heres ex asse*, the heir to the whole estate.

ASA, king of Judah, succeeded his father Abijam. He pulled down the altars erected to idols, restored the worship

Arx
Aix.

* See Bam-
boo.

* See Cane.

Asa
||
Afarum.

worship of the true God, and, with the assistance of Benhadad king of Syria, took several towns from the king of Israel. He died 917 years before the Christian era, and was succeeded by Jehoshaphat.

ASA, or ASSA, in the materia medica, a name given to two very different substances, called *asa-dulcis*, and *asa-fetida*.

* See Benzoin.

ASA-DULCIS is the same with Benzoin *.

ASA-FETIDA is the concrete juice of a large umbelliferous plant growing in Persia. This juice exudes from wounds made in the root of the plant, liquid and white like milk. When exposed to the air, it turns of a brownish colour, and gradually acquires different degrees of consistence. It is brought to us in large irregular masses, composed of various little shining grains, which are partly whitish, partly reddish, and partly of a violet colour. Those masses are accounted the best which are clear, of a pale reddish colour, and variegated with a great number of elegant white tears. This drug has a strong fetid smell, like garlic; and a bitter, acrid, biting taste. It is frequently used in hyetoric and nervous complaints, flatulent colics, and as a promoter of the menses. See MATERIA MEDICA, n° 129.

ASAPH (St.), a city in Flintshire, with a bishop's see; on which account only it is taken notice of; for it is so poor a place, it would not otherwise be worth mentioning. W. Long. 3. 25. N. Lat. 53. 18.

ASAPPEES, or AZAPES, in the Turkish armies, a name given to the auxiliary troops which they raise among the Christians under their dominion, and expose to the first shock of the enemy.

ASAR-ADDON, or ASER-HADDON, the son of Sennacherib, succeeded his father about 712 years before the Christian era, and united the kingdoms of Nineveh and Babylon. He rendered himself master of Syria; sent a colony to Samaria; and his generals took king Manasseh, and carried him loaded with chains to Babylon. Asar-Addon died after a reign of 12 years.

ASARINA. See CHELONE.

ASARUM, ASARABACCA; a genus of the monogynia order, belonging to the dodecandria class of plants.

Species. Of this genus there are three species; the European, the Canadianse, and Virginicum. The first species grows naturally in some parts of England. It hath thick fleshy jointed roots; the leaves grow singly upon short foot-stalks, which arise immediately from the root: the flowers grow upon very short foot-stalks close to the ground, so are hid under the leaves. They have a bell-shaped empalement, of a worn-out purple colour, which is cut in three at the top, where it turns backward. It delights in a moist shady place, and may be propagated by parting the roots in autumn. The two other species have no remarkable properties.

Medicinal Uses. The dried roots of this plant have been generally brought from the Levant; those of our own growth being supposed weaker.

Both the roots and leaves have a nauseous, bitter, acrimonious, hot taste; their smell is strong, and not very disagreeable. Given in substance from half a dram to a dram, they evacuate powerfully both upwards and downwards. It is said, that tinctures made in spirituous menstrua, possess both the emetic and cathartic virtues of the plant; that the extract obtained by inspissating these tinctures, acts only by vomit, and with great mildness; that an infusion in water proves ca-

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thartic, rarely emetic; that aqueous decoctions made by long boiling, and the watery extract, have no purgative or emetic quality, but prove notable diaphoretics, diuretics, and emmenagogues.

The principal use of this plant among us is as a sennutatory. The root of asarum is perhaps the strongest of all the vegetable errhines, white hellebore itself not excepted. Snuffed up the nose, in the quantity of a grain or two, it occasions a large evacuation of mucus, and raises a plentiful spitting. The leaves are considerably milder, and may be used to the quantity of three, four, or five grains. Geoffroy relates, that after snuffing up a dose of this errhine at night, he has frequently observed the discharge from the nose to continue for three days together; and that he has known a paralysis of the mouth and tongue cured by one dose. He recommends this medicine in stubborn disorders of the head proceeding from viscid tenacious matter, in palsies, and in foriporic distempers *.

ASBESTOS, a sort of native fossil stone, which may be split into threads and filaments, from one inch to ten inches in length, very fine, brittle, yet somewhat tractable, silky, and of a greyish colour, not unlike talc of Venice. It is almost insipid to the taste, indissoluble in water, and endowed with the wonderful property of remaining unconsumed in the fire, which only whitens it. There are some sorts of asbestos whose filaments are rigid and brittle; others more flexible.

The first are not at all to be spun or formed into cloth, and the latter very difficultly. This manufacture appears to have been known among the ancients, who, according to Pliny, wrapt the corpses of the dead in asbestos clothes to preserve their ashes separate from those of the funeral pile; an use to which they are still said to be applied among the princes of Tartary. The method of preparation, as described by Ciampini in the Philosophical Transactions, n° 273, is as follows. The stone is laid to soak in warm water, then opened and divided by the hands, that the earthy matter may be washed out. This earth is white like chalk, and renders the water thick and milky. The ablation being several times repeated, the flax-like filaments are collected and dried: they are most commodiously spun with an addition of flax. Two or three filaments of the asbestos are easily twisted along with the flaxen thread, if the operator's fingers are kept oiled. The cloth also when woven is best preserved by oil from breaking or waisting. On exposure to the fire, the flax and oil burn out, and the cloth comes out pure and white. Probably from the dissipation of some extraneous matter of this kind proceeded the diminution of weight which an asbestos napkin suffered in the fire, in an experiment made before the Royal Society; for pure asbestos loses nothing.—The shorter filaments, which separate in washing the stone, may be made into paper in the common manner. This stone is found in many places of Asia and Europe; particularly in the island of Anglesey in Wales, and in Aberdeenshire in Scotland.

ASBAMEA, a fountain of Cappadocia, near Tyana, sacred to Jupiter, and to an oath. Tho' this fountain bubbled up, as in a state of boiling, yet its water was cold; and never ran over, but fell back again, (Philostratus, Ammian).

ASCALON, an ancient city, and one of the five

4 Y

fatrapies

Asbestos
||
Afcalon.

* See Materia Medica, n° 130.

Afcenius
Ascension.

fatrapies or principalities of the Philistines; situated on the Mediterranean, 43 miles to the south-west of Jerusalem, (Antonine), between Azotus to the north, and Gaza to the south. The birth-place of Herod the Great, thence surnamed *Afcalonitis*, (Stephanus). Famous for its scallions, which take name from this town, (Strabo, Pliny). Now *Scalona*. E. Long. 34. 30. Lat. 31. 30.

ASCANIUS, the son of Æneas and Creusa, succeeded his father in the kingdom of the Latins, and defeated Mezentius king of the Tuscans, who had refused to conclude a peace with him. At length he founded Alba Longa; and died about 1139 years before the Christian æra, after a reign of 38 years.

ASCARIS, in zoology, a genus of insects belonging to the order of vermes intestina. The body of the ascaris is cylindrical, filiform, and tapers at both ends. The species are two, viz. 1. The vermicularis, with faint annular rugæ, and the mouth transverse, is about a quarter of an inch long, and thicker at one end than the other. It is found in boggy places, in the roots of putrid plants, and very frequently in the rectum of children and horses. It emaciates children greatly, and is sometimes vomited up. 2. The lumbricoides is about the same length with the lumbricus terrestris, or common earth-worm; but it wants the protuberant ring towards the middle of the body, the only mark by which they can properly be distinguished. The body of the lumbricoides is cylindrical, and subulated at each extremity; but the tail is somewhat triangular. The lumbricoides is the worm which is most commonly found in the human intestines. It is viviparous, and produces vast numbers. For the method of expelling these two kinds of insects, see the *Index* subjoined to MEDICINE.

ASCENDANTS, in law, are opposed to descendants in succession; i. e. when a father succeeds his son, or an uncle his nephew, &c. heritage is said to ascend, or go to ascendants.

ASCENDING, in astronomy, is said of such stars as are rising above the horizon in any parallel of the equator.

ASCENDING Latitude, is the latitude of a planet when going towards the north pole.

ASCENDING Node, is that point of a planet's orbit, wherein it passes the ecliptic, to proceed northward. This is otherwise called the *northern node*, and represented by this character ♄.

ASCENDING Vessels, in anatomy, those which carry the blood upwards; as the aorta ascendens *.

* See Aorta.

ASCENSION, in astronomy, is either right or oblique. Right ascension of the sun, or a star, is that degree of the equinoctial, counted from the beginning of aries, which rises with the sun or star in a right sphere. Oblique ascension is an arch of the equator intercepted between the first point of aries, and that point of the equator which rises together with a star in an oblique sphere.

ASCENSION Day, a festival of the Christian church, held ten days before Whitsuntide, in memory of our Saviour's ascension into heaven after his resurrection.

ASCENSION Island, a barren island on the coast of Africa, lying in W. Long. 17. 20. S. Lat. 7. 5. The following account is given of it by Mr Forster. "This island was first discovered in 1501, by Joao

de Nova Galego, a Portuguese navigator, who named it *Ilha de Nossa Senhora de Conceição*. The same admiral, on his return to Portugal in 1502, discovered the island of St Helena, which obtained that name from the day of the discovery. Ascension was seen a second time by Alfonso d'Albuquerque on his voyage to India in 1503, and then received the name it now bears; but was already at that time in the same desolate condition as at present. We sent several parties on shore, who passed the night on the watch for turtles, which came to lay their eggs on the sandy shores. The dreariness of this island surpassed all the horrors of Easter Island and Tierra del Puego, even without the assistance of snow. It was a ruinous heap of rocks, many of which, as far as we could discern from the ship, seemed to be totally changed by the fire of a volcano. Nearly in the centre of the island rises a broad white mountain of great height, on which we discerned some verdure by the help of our glasses, from whence it has obtained the name of *Green Mountain*.

"We landed early in the morning among some rocks, the surf being always immensely high on the great beach; which consists of minute shell-sand, chiefly of a snowy white, very deep, dry, and intolerable to the eyes when the sun shines. We ascended among heaps of black cavernous stone, which perfectly resembles the most common lavas of Vesuvius and Iceland, and of which the broken pieces looked as if they had been accumulated by art. The lava currents cooling very suddenly, may easily be imagined to produce such an effect. Having ascended about 12 or 15 yards perpendicular, we found ourselves on a great level plain, of six or eight miles in circuit; in the different corners of which, we observed a large hill of an exact conical shape, and of a reddish colour, standing perfectly insulated. Part of the plain between these conic hills was covered with great numbers of smaller hillocks, consisting of the same wild and ragged lava as that near the sea, and ringing like glass when two pieces are knocked together. The ground between the heaps of lava was covered with a black earth, on which we walked very firmly; but when these heaps did not appear, the whole was a red earth, which was so loose, and in such dry minute particles, that the wind raised clouds of dust upon it. The conic hills consisted of a very different sort of lava, which was red, soft, and crumbling into earth. One of these hills stands directly in front of the bay, and has a wooden cross on its summit, from whence the bay is said to take its name. Its sides are very steep, but a path near three quarters of a mile long winds round it to the summit. After examining this remarkable country a little longer, we concluded, with a great degree of probability on our side, that the plain on which we stood was once the crater or seat of a volcano, by the accumulation of whose cinders and pumice-stones the conic hills had been gradually formed: that the currents of lava which we now saw divided into many heaps, had perhaps been gradually buried in fresh cinders and ashes; and the waters coming down from the interior mountain in the rainy season had smoothened every thing in their way, and filled up by degrees the cavity of the crater. The rocky black lava was the residence of numberless men-of-war birds and boobies, which sat on their eggs, and suffered us to come close to them.

"About

Ascension.

"About eight in the evening, it being then quite dark, a small vessel came into the bay, and anchored directly within us. Captain Cook having hailed her repeatedly, received in answer, that she was the *Lucretia*, a New-York sloop, which had been at Sierra Leon, and was now come to catch turtles, in order to sell them at the windward islands of the West Indies. A lieutenant was sent on board, who learned from the master, that he had taken our ship to be a French Indianman, and was very desirous of trading with English India-ships, in which he was disappointed by the company's regulations. He dined with our officers the next day, but on the 31st at day-break left the island. On the 30th in the morning, we landed a second time; and, crossing the plain, arrived at a prodigious lava-current, intersected by many channels from six to eight yards deep, which bore strong marks of being worn by vast torrents of water, but were at present perfectly dry, the sun being in the northern hemisphere. In these gullies we found a small quantity of soil consisting of a black volcanic earth, mixed with some whitish particles gritty to the touch. Here we saw some small bunches of purslane, and a species of grass (*panicum sanguineum*) which found sufficient nutriment in the dry soil. Having at last, with great fatigue, climbed over this extensive and tremendous current of lava, which was much more solid than the heaps nearer to the sea, we came to the foot of the Green Mountain, which even from the ships place in the bay we had plainly distinguished to be of a different nature from all the rest of the country. Those parts of the lava which surrounded it were covered with a prodigious quantity of purslane, and a kind of new fern (*lonchites Adscensionis*), where several flocks of wild goats were feeding. The great mountain is divided in its extremities, by various clefts, into several bodies; but in the centre they all run together, and form one broad mass of great height. The whole appears to consist of a gritty tophaceous lime-stone, which has never been attacked by the volcano, but probably existed prior to its eruption; its sides are covered with a kind of grass, peculiar to the island, which Linnæus has named *aristida Adscensionis*. We likewise observed several flocks of goats feeding on it; but they were all excessively shy, and ran with surprising velocity along tremendous precipices, where it was impossible to follow them. The master of the New-York sloop acquainted us, that there is a spring of water on one part of this mountain, which falls down a great precipice, and is afterwards absorbed in the sand. I am almost persuaded, that, with a little trouble, Ascension might shortly be made fit for the residence of men. The introduction of furze (*ulex Europæus*), and of a few other plants which thrive best in a parched soil, and are not likely to be attacked by rats or goats, would soon have the same effect as at St Helena. The moisture attracted from the atmosphere by the high mountains in the centre of the island, would then no longer be evaporated by the violent action of the sun, but collect into rivulets, and gradually supply the whole island. A sod of grasses would every where cover the surface of the ground, and annually increase the stratum of mould, till it could be planted with more useful vegetables.

"We returned gradually to Crofs Bay, in the heat of noon, over the plain; having a space of more than five

miles to traverse, where the sun burnt and blistered our faces and necks, and heated the soil to such a degree, that our feet were likewise extremely fore. About three o'clock we arrived at the water's side; and after bathing in a small cove among a few rocks, we made the signal for a boat, and were taken on board. The next forenoon we made another small excursion, in company with captain Cook, towards the Green Mountain; but we were all of us so much fatigued, that we could not reach it. We made no new observations in the course of this day, the nature of the island being dreary beyond description in its outskirts."

ASCENSIONAL DIFFERENCE, the difference between the right and oblique ascension of the same point to the surface of the sphere.

ASCENT, in a general sense, implies the motion of a body upwards, or the continual recess of a body from the earth. The Peripatetics attribute the spontaneous ascent of bodies to a principle of levity inherent in them. The moderns deny any such thing as spontaneous levity; and shew, that whatever ascends, does it in virtue of some external impulse or extrusion. Thus it is that smoke and other rare bodies ascend in the atmosphere; and oil, light woods, &c. in water; not by any external principle of levity, but by the superior gravity or tendency downwards of the parts of the medium wherein they are. The ascent of light bodies in heavy mediums is produced after the same manner as the ascent of the lighter scale of a balance. It is not that such scale has an internal principle whereby it immediately tends upwards; but it is impelled upwards by the preponderancy of the other scale; the excess of the weight of the one having the same effect, by augmenting its impetus downwards, as so much real levity in the other; by reason the tendencies mutually oppose each other, and that action and reaction are always equal.

ASCENT of Bodies on Inclined Planes, the reader will find explained under MECHANICS; ASCENT of Fluids, under HYDROSTATICS; and ASCENT of Vapours, under the article EVAPORATION.

ASCESIS, properly denotes exercise of the body. It is formed from the verb *ævo*, used by the ancients in speaking of the sports and combats of the athlete.

ASCESIS is also used by philosophers, to denote an exercise conducive to virtue, or to the acquiring a greater degree of virtue. This is particularly denominated the *philosophical ascesis*, because practised chiefly by philosophers, who make a more peculiar profession of improving themselves in virtue; on the model whereof, the ancient Christians introduced a religious *Ascesis*.

ASCETERIUM, in ecclesiastical writers, is frequently used for a monastery, or place set apart for the exercises of virtue and religion. The word is formed from *ascesis*, exercise; or *ascetra*, one who performs exercise. Originally it signified a place where the athletes or gladiators performed their exercises.

ASCETICS, in church-history, such Christians in the primitive church as enured themselves to great degrees of abstinence and fasting, in order to subdue their passions.

ASCHAFENBURG, a town of Germany, seated on the river Main, in the circle of the lower Rhine, and territory of the elector of Mentz, who has a palace there. It is memorable for being the place where the king of Great Britain took up his quarters the night

Afcham,
Afcidia.

before the battle of Dettingen. E. Long. 9. 35. N. Lat. 50. 14.

ASCHAM (Roger) was born at Kirby-Wilke, near North-Allerton in Yorkshire, in the year 1516. His father was steward to the noble family of Scroop. Our author Roger was educated in the family of Sir Anthony Wingfield, who, about the year 1530, sent him to St. John's College, Cambridge, where he was soon distinguished for his application and abilities. He took his degree of bachelor of arts at the age of eighteen, was soon after elected fellow of his college, and in 1536 proceeded master of arts. In 1544, he was chosen university orator; and, in 1548, was sent for to court, to instruct the lady Elizabeth (afterwards queen) in the learned languages. In the year 1550, he attended Sir Richard Moreline, as secretary, on his embassy to the emperor Charles V. at whose court he continued three years, and in the mean time was appointed Latin secretary to king Edw. VI. But, upon the death of that prince, he lost his preferment and all his hopes, being professedly of the reformed religion; yet, contrary to his expectations, he was soon after, by the interest of his friend lord Paget, made Latin secretary to the king and queen. In June 1554, he married Mrs Maragret How, a lady of a good family, with whom he had a considerable fortune. It is very remarkable of Mr Afcham, that, tho' he was known to be a Protestant, he continued in favour not only with the ministry of those times, but with queen Mary herself. Upon the accession of queen Elizabeth, he was not only confirmed in his post of Latin secretary, but was constantly employed as preceptor to her majesty in the Greek and Latin languages. He died in the year 1568, much regretted, especially by the queen, who said she had rather lost ten thousand pounds. Camden and some other writers tell us, that he had a great propensity to dice and cock-fighting. He certainly died poor.—He wrote,

1. *Toxophilus*. The scholæ or partitions of shooting, contained in two books, written by Roger Afcham, 1544, and now newly perused. Pleasant for all gentlemen and yeomen of England, &c. Lond. 1571. Whilst at the university he was fond of archery by way of exercise and amusement, for which he was censured; and on that account he sat down to write this book, which was dedicated to Hen. VIII. who settled a pension of 10l. per annum on the author. It is rather whimsical; but is admirably well written, and full of learning. 2. A report and discourse, written by Roger Afcham, of the affairs and state of Germany, and the emperor Charles his court, &c. 4to. A valuable curiosity. 3. *The schoolmaster*. First printed in 1573, 4to. Mr Upton published an edition with notes in 1711. It has uncommon merit; abounding in great good sense, as well as knowledge of ancient and modern history: it is also expressive of the great humanity of the author, who was for making the paths of knowledge as level and pleasant as possible, and for trying every gentle method of enlarging the mind and winning the heart. 4. *Latin epistles*. First published by Mr Grant in 1576; have since passed many editions: the best is that of Oxford in 1703. Much admired on account of the style, and esteemed almost the only classical work of that kind written by an Englishman. 5. *Apologia contra misfam*. 1577, 8vo.

ASCIDIA, a genus of animals belonging to the or-

der of vermes mollusca. The body is cylindrical, and fixed to a shell, rock, &c. It has two apertures; one on the summit, the other lower, forming a sheath. There are six species of this animal, viz. the papillosum, gelatinosum, intestinalis, quadridentata, rustica, and echinata; only one of which, viz. the rustica, is found in the British seas. Animals of this genus have the faculty of squirting out the water they take in.

ASCII, among geographers, an appellation given to those inhabitants of the earth who, at certain seasons of the year, have no shadow: such are all the inhabitants of the torrid zone, when the sun is vertical to them.

ASCITÆ, (from *ascus*, a bag or bottle), in antiquity a sect or branch of Montanists, who appeared in the second century. They were so called, because they introduced a kind of Bacchanals into their assemblies, who danced round a bag or skin blown up; saying, They were those new bottles filled with new wine, whereof our Saviour makes mention, Matth. ix. 17.—They are sometimes also called *Ascrogitæ*.

ASCITES, in medicine, the dropsy.

ASCLEPIA, a festival of Esculapius the god of physic, observed particularly at Epidaurus, where it was attended with a contest between the poets and musicians, whence it was likewise called *ἱεσος ἁγυς*, the sacred contention.

ASCLEPIAD, in ancient poetry, a verse composed of four feet, the first of which is a spondee, the second a choriambus, and the two last dactyls; or of four feet and a cæsura, the first a spondee, the second a dactyl, after which comes the cæsura, then the two dactyls; as, *Mæcenat atavii edite regibus*.

ASCLEPIADES, one of the most celebrated physicians among the ancients, was a native of Prusa, in Bithynia; and practised physic at Rome, under Pompey, ninety-six years before the Christian era. He was the head of a new sect; and, by making use of wine and cold water in the cure of the sick, acquired a very great reputation. He wrote several books, which are frequently mentioned by Galen, Celsus and Pliny; but they are now lost.

ASCLEPIADES, a famous physician under Hadrian, of the same city with the former: he wrote several books concerning the composition of medicines, both internal and external.

ASCLEPIAS, SWALLOW-WORT; a genus of the digynia order, belonging to the pentandria class of plants.

Species. Of this genus there are 19 species enumerated by botanical writers; but the following are the most remarkable. 1. The alba, or common swallow-wort. The root is composed of many strong fibres connected at top like those of asparagus, from whence arise many stalks, in number proportional to the size of the roots, which grow two feet high, and are very slender at the top: the leaves are placed opposite by pairs; the flowers are white, growing in umbels near the top of the stalk, from whence are sent out smaller umbels. After the flower is past, the two germeus become long pointed pods, including many compressed seeds lying imbricatum, which are crowned with a soft white down. It flowers in June, and the seeds ripen in September. It is a native of the south of France, Spain, and Italy. 2. The Syriaca, or greater Syrian dogsbane, is a perennial plant, which sends up several upright stalks in the spring, about two feet high, garnished with oval leaves

Afcii
Afclepias.

Plate XLII.
fig. 2.

Asclepias
||
Ascyrum.

leaves growing opposite; at the top of the stalks the umbels of flowers are produced, which are of a bright purple colour, making a pretty appearance, but are not succeeded by pods in England. 3. The curraflavica, or ballard ipecacuanha, is a native of the warm parts of America. It rises to the height of five or six feet, with upright stems, and smooth oblong leaves placed opposite. Toward the top of the branches the umbels of flowers come out, which stand erect: the petals of the flowers are of a scarlet colour, and the horny nectariums in the middle are of a bright saffron colour, which make a pretty appearance; and there is a succession of flowers on the same plant from June to October. The flowers are succeeded by long taper pods, filled with seeds crowned with a soft down, which ripen late in autumn. The first two species are hardy; but the last one is tender, and therefore must be preserved in a stove.

Medicinal Uses, &c. The root of the first species is used in medicine. It is reckoned by botanists a species of opoponum, or dogbane; from all the poisonous sorts of which it may be distinguished, by yielding a limpid juice, whilst that of the others is milky. The root has a strong smell, especially when fresh, approaching to that of valerian, or nard; the taste is at first sweetish and aromatic, but soon becomes bitterish, subacrid, and nauseous. This root is esteemed fudorific, diuretic, and emmenagogue: it is also frequently employed by the French and German physicians as an alexipharmic, and sometimes as a succedaneum to contrayerva, whence it has received the name of *contrayerva Germanorum*. Among us it is very rarely made use of: it appears from its sensible qualities to be a medicine of much the same kind with valerian, which is indisputably preferable to it.

The root of the third species has been sometimes sent over from America instead of that of ipecacuanha, and mischievous effects have been produced by it. Those who cultivate this plant ought to be careful that none of its milky juice mix with any thing which is taken inwardly.

ASCODRUTÆ, in antiquity, a sect of heretics, in the second century, who rejected all use of symbols and sacraments, on this principle, That incorporeal things cannot be communicated by things corporeal, nor divine mysteries by any thing visible.

ASCOLI, formerly *Aiculum Apulum*, a pretty large and populous town of Italy, in the marche of Ancona, and territory of the church; it is a bishop's see, and seated on a mountain, at the bottom of which runs the river Fronto. E. Long. 15. 20. N. Lat. 42. 47.

ASCOLI DE SATTIANO, formerly *Aiculum Picenum*, an episcopal city of Italy, in the kingdom of Naples; seated on a mountain. E. Long. 15. 5. N. Lat. 42. 8.

ASCOLIA, in Grecian antiquity, a festival celebrated by the Athenian husbands in honour of Bacchus, to whom they sacrificed a he-goat, because it destroys the vines (Ovid. Fast. i. 357.); and, to shew the greater indignity to an animal hated by Bacchus, the peasants, after having killed him, made a foot-ball of his skin. Virgil has beautifully described the occasion of the sacrifice, and manner of celebrating the festival, Georg. ii. 380.

ASCYRUM, *PETERS-WORT*; a genus of the polyandria order, belonging to the polydelfia class of plants. Of this genus there are three species; but they have

no property worthy of notice, and therefore are never cultivated but in botanic gardens for the sake of variety.

ASDRUBAL, the name of several Carthaginian generals. See *CARTHAGE*.

ASELLUS, in zoology, the trivial name of a species of oniscus. See *ONISCUS*.

ASGILL (John), a late humorous writer, was bred to the law, and practised in Ireland with great success. He was there elected a member of the house of commons, but was expelled for writing a treatise on the possibility of avoiding death; and being afterwards chosen a member for the borough of Bramber, in Suffex, he was also on the same account expelled the parliament of England. After this, he continued thirty years a prisoner in the mint, fleet, and king's-bench; during which time he published a multitude of small political pamphlets, several of which were in defence of the succession of the house of Hanover, and against the pretender. He died in the rules of the king's-bench, in the year 1738, when he was upwards of fourscore.

ASH, in botany. See *FRAXINUS*.

Ash-Hole, among chemists, is the lowest part of a furnace; and is intended to receive the ashes falling from the fire, and to give a passage to the air which is to be introduced into the furnace, to keep up the combustion.

Ash-Wednesday, the first day of Lent; supposed to have been so called from a custom in the church, of sprinkling ashes that day on the heads of penitents then admitted to penance. See *LENT*.

ASHBORN, a town in Derbyshire, seated between the rivers Dove and Compton, over which there is a stone bridge, in a rich soil. It is a pretty large town, though not so flourishing as formerly. W. Long. 1. 35. N. Lat. 53. 0.

ASHBURTON, a town in Devonshire. It sends two members to parliament, and is one of the four tannery towns. It is seated among the hills, which are remarkable for tin and copper; and has a very handsome church; as also a chapel, which is turned into a school. W. Long. 3. 10. N. Lat. 50. 30.

ASHBY DE LA ZOUCH, a market town in Leicestershire, situated in W. Long. 1. 20. N. Lat. 52. 40. It had a castle which was long in the possession of the family of de la Zouch. It afterwards fell into the hands of Edward IV. who granted it to Sir Edward Hastings, created baron Hastings, with licence to make a castle of the manor house, to which he adjoined a very high tower. It was demolished in 1648; but a great part of the tower is still standing. It now belongs to the earl of Huntingdon.

ASHES, the earthy particles of combustible substances after they have been burnt.

If the ashes are produced from vegetable bodies, they contain a considerable quantity of fixed salt, blended with the terrene particles: and from these ashes the fixed alkaline salts called *pot-ashes*, *pearl-ashes*, &c. are extracted.

The ashes of all vegetables are vitrescible, and found to contain iron.—They are also an excellent manure for cold and wet grounds. See *AGRICULTURE*, n° 21.

ASHFORD, a market-town of Kent, situated about 12 miles south-west of Canterbury, in E. Long. 45. and N. Lat. 51. 15.

ASHMOLE (Elias), a great antiquary and herald, founder

Asdrubal
||
Ashmole.

Ashmole, founder of the Ashmolean museum at Oxford, was born at Litchfield in Staffordshire, 1617. In the early part of his life, he practised in the law; and in the civil war had a captain's commission under the king, and was also comptroller of the ordnance. He married the lady Mainwaring in 1649, and settled at London; where his house was frequented by all the learned and ingenious men of the time. Mr Ashmole was a diligent and curious collector of manuscripts. In the year 1650, he published a treatise written by Dr Arthur Dee, relating to the philosopher's stone; together with another tract on the same subject, by an unknown author. About the same time, he was busied in preparing for the press a complete collection of the works of such English chemists as had till then remained in manuscript. This undertaking cost him great labour and expence; and at length the work appeared, towards the close of the year 1652. He proposed at first to have carried it on to several volumes; but he afterwards dropped this design, and seemed to take a different turn in his studies. He now applied himself to the study of antiquity and records: he was at great pains to trace the Roman road, which in Antoninus's Itinerary is called *Bennevanna*, from Weedon to Litchfield, of which he gave Mr Dugdale an account in a letter. In 1658, he began to collect materials for his history of the order of the garter, which he lived to finish, and thereby did no less honour to the order than to himself. In September following, he made a journey to Oxford, where he set about giving a full and particular description of the coins presented to the public library by archbishop Laud.

Upon the restoration of king Charles II. Mr Ashmole was introduced to his majesty, who received him very graciously; and on the 18th of June 1660, bestowed on him the place of Windsor herald. A few days after, he appointed him to give a description of his medals, which were accordingly delivered into his possession, and king Henry VIII's closet was assigned for his use. On the 15th of February, Mr Ashmole was admitted a fellow of the royal society; and, on the 9th of February following, the king appointed him secretary of Surinam, in the West Indies. On the 19th of July 1699, the university of Oxford, in consideration of the many favours they had received from Mr Ashmole, created him doctor of physic by diploma, which was presented to him by Dr Yates, principal of Brazen Nose college. On the 8th of May 1672, he presented his "Institution, laws, and ceremonies of the most noble order of the garter," to the king; who received it very graciously, and, as a mark of his approbation, granted him a privy seal for 400*l.* out of the custom of paper. On the 26th January 1679, a fire broke out in the Middle Temple, in the next chamber to Mr Ashmole's, by which he lost a noble library, with a collection of 9000 coins, ancient and modern, and a vast repository of seals, charters, and other antiquities and curiosities; but his manuscripts and his most valuable gold medals were luckily at Lambeth. In 1683, the university of Oxford having finished a magnificent repository near the theatre, Mr Ashmole sent thither his curious collection of rarities; which benefaction was considerably augmented by the addition of his manuscripts and library at his death, which happened at Lambeth, the 18th of May, in the 76th year of his age. He was interred in the church of Great-Lambeth, in

Surry, on the 26th of May 1692, and a black marble stone laid over his grave, with a Latin inscription.

Besides the works which we have mentioned, Mr Ashmole left several which were published since his death, and some which remain still in manuscript.

ASIA, is one of the three general parts of our continent, and one of the four of the whole earth. It is separated from Europe by the Mediterranean sea, the Archipelago, the Black Sea, the Palus Meotis, the Don, and the Dwina, which fall into the White Sea; and from Africa, by the Arabic Gulph or Red Sea; and the Isthmus of Suez. All the other parts are surrounded by the ocean. The late discoveries shew that it does not join to America, though it extends very near it. It is situated between 44 and 196 degrees of east longitude, and 1 and 74 degrees of north latitude. From the Dardanelles to the most eastern shore of Tartary, it is 4740 miles in length; and from the most southern point of Malacca to the most northern point of Nova Zembla, it is 4380 miles in breadth. It may be divided into the following parts: Turkey in Asia, Arabia, Persia, the Mogul's Empire, with the two peninsulas of the Indies; Tibet, China, and Korea; Great and Little Buckaria, with Korasin; Tartary, Siberia, and the islands. The principal governments are generally monarchical. Turkey, Persia, the Mogul's Empire, and China, are subject to single monarchs; the rest are divided among several sovereigns. Siberia is subject to the Russians; Little Tartary to the Tartars of the Crim; Great Tartary, partly to the Russians, partly to its own monarch, and partly to China. Great Buckaria is subject to the Persians; and Little Buckaria, partly to the Tartars, and partly to the emperor of China. As to the number of the potentates, there are seven emperors, thirty kings, besides petty princes, and the rajahs of India. The emperors are, the grand signior, the great mogul, the emperor of Japan, the khan of the Eluth Tartars, the emperor of Russia, the emperor of China, and the shah of Persia. The principal kings are, the sheriffs of Mecca and Medina; the sultans of Yamen, or Arabia the Happy; the grand lama of Tibet; the kings of Siam, Ava, Siam, Tonquin, Cochinchina, Korea, Ceylon, Borneo, &c.

The principal religions of Asia are, the Christian, the Mahomedan, the Pagan, and that of Confucius. The Christian religion is professed in some parts of Asiatic Turkey, part of Little Tartary, the north-west part of Persia, and by the Russians in Siberia. The Mahomedan is established in Arabia, Persia, Little Tartary, Buckaria, and the Mogul's empire. It likewise begins to spread along the coast of India, and in the islands. The Pagan religion, by which we understand that wherein images are used, or wherein the worship of the Deity is mixed with that of idols, is professed by the bulk of the inhabitants of the Mogul's empire, in both the peninsulas of India, in China and Siberia, in the islands of Asia, in all Western Tartary, in Tibet, and in all the countries between India and China. The religion of Confucius is established in China. Formerly the religion professed in Tartary was downright Deism, as appears from the history of Jenghiz Khan; but the inhabitants of that country are now sunk in the grossest superstitions.

The languages of Asia are so many, that we cannot pretend

pretend to enumerate them all, and therefore we shall only mention the chief. The principal of Turkey in Europe, are the Grecian and Turkish; the Armenian is spoken in part of Turkey in Asia and Persia; the Arabic is the only tongue in Arabia, and is spread over part of Turkey in Asia, as a learned language. The Persian is used in Persia, and the court of the great mogul. The Indian is spoken in India, by the ancient inhabitants of that country. The Malayan language is common on the coast of India, and in some of the islands; the Siamese in Siam; the Tibetan in Tibet; and the Manchew in China and eastern Tartary; and the Tartarian in Great Tartary. Besides these, there are several distinct languages in Siberia and the islands of Asia. The characters they make use of in writing are almost as different as the languages, having each characters of their own, except the Chinese, which are used in Japan as well as China, as also in Tonking and Cochinchina.

The chief rivers of Asia are, the Euphrates and Tigris, in Turkey; the Indus and Ganges, in India; the Kiang and Hoang-ho, in China; the Sir Amu and Wolga, in Western Tartary; the Saghalia Ula or Amur, in Eastern Tartary; the Irtilh, Oby, Jenisea, and Lena, in Siberia. The lakes are, that prodigious one called the *Caspian Sea*; and near that another very large one, but lately known to us, called *Aral*, or the lake of eagles. The Baykal is in Siberia, the Kokonor near Tibet, and the Tong Ping in China. The chief mountains are, the Taurus in Turkey and Persia; the Imaus, between India and Tibet; and the Altay, in Tartary.

The Asian islands are very numerous, inasmuch that some reckon 150,000; but of this there is no certainty. However, they may be divided into those of the east, west, south, and south-east. Those that lie on the east of Asia are, the islands of Jesso or Yedso, and Japan, with several small ones on the coast of Korea, the island of Formosa, and the Philippines. Those on the west, are the island of Cyprus, in the Mediterranean; Scanderoon, off Naxos, and the isle of Rhodes, off Phischo, on the same coast. Those on the south are, the isles of the Maldives, in the Indian Sea; the isle of Ceylon, off cape Komorin; with a great many small ones in the gulph of Bengal. Those on the south-east are, the isles of Sandi, as Sumatra, the isles of Java, Borneo, &c. the Moluccas, the isles of Kumbava, Timor, &c. See all these articles in their proper places.

ASIA *Minor*, or *Lesser Asia*; the same with *Natalia*. See *NATOLIA*.

ASIARCHÆ, (termed by St Paul, *Chief of Asia*, Acts xix. 31.) were the Pagan Pontiffs of Asia, chosen to superintend and have the care of the public games; which they did at their own expence; for which reason they were always the richest and most considerable men of the towns.

ASIDE, in the drama, something said by an actor, which some, or even all the other actors present, are supposed not to hear; a circumstance justly condemned as being unnatural and improbable.

ASIITO, a town of Italy, in Perugia, and in the Pope's territories. E. Long. 23. 40. N. Lat. 43. 0.

ASILUS, or HORNET-FLY, a genus of insects belonging to the order of insecta diptera. It has two

wings; and a horny, strait, two-valved beak. There are 17 species of this insect. Many of them wound in a very painful manner; others of them are quite harmless.

ASINARA, an island of Italy, on the western coast of Sardinia. E. Long. 8. 30. N. Lat. 41. 0.

ASINIUS (Pollio), consul and Roman orator, distinguished himself under Augustus by his exploits and his literary works. He is frequently mentioned with praises by Horace and Virgil, and is said to have collected the first library at Rome. He died at Fregati, at 80 years of age.

ASISIO, or ASIRIO, a city of the Pope's territories in Italy, situated about 16 miles east of Perugia. E. Long. 13. 35. N. Lat. 43.

ASKRIG, a town in the N. Riding of Yorkshire. W. Long. 0. 5. N. Lat. 53. 50.

ASLANI, in commerce, a silver coin, worth from 115 to 120 alpers. See *ASPER*.

ASMONEUS, or ASSAMONEUS, the father of Simon, and chief of the Asmoneans, a family that reigned over the Jews during 126 years.

ASNA, or ESNA, a town in Upper Egypt, seated upon the Nile, believed by some authors to be the ancient Syene, though others say the ruins of it are still to be seen near Aswan. It is so near the cataracts of the Nile, that they may be heard from thence. It contains several monuments of antiquity; and among the rest an ancient Egyptian temple, pretty entire, all painted throughout, except in some places that are effaced by time. The columns are full of hieroglyphic figures. This superb structure is now made use of for a stable, wherein they put oxen, camels, and goats. A little way from thence are the ruins of an ancient nunnery, said to be built by St Helena, surrounded with tombs.—Asna is the principal town in these parts, and the inhabitants are rich in corn and cattle. They drive a considerable trade into Lower Egypt and Nubia, by means of the Nile, and also by the caravans that pass over the Desert. The inhabitants are all Arabs, except about 200 Copts, the ancient inhabitants, and a sort of Christians. They are under the government of the Turks, who have a cadi, and the Arabs have two she-riffs of their own nation. E. Long. 31. 40. N. Lat. 38. 15.

ASOLA, a town of the Bressian in Italy, belonging to the republic of Venice. E. Long. 14. 18. N. Lat. 45. 15.

ASOLO, a town of Italy, in the Trevifan, seated on a mountain 17 miles north-west of Trevifan, and 10 north-east of Bassano. E. Long. 12. 2. N. Lat. 45. 49.

ASOPH, a town of Coban Tartary, in Asia, seated on the river Don, near its mouth, a little to the east of the Palus Mæotis, or Sea of Azoph. It has been several times taken and retaken of late years; but in 1739, the contending powers agreed that the fortifications should be demolished, and the town remain under the dominion of Russia. E. Long. 41. 30. N. Lat. 47. 18.

ASOPUS, a river of Phrygia Major, which, together with the Lycus, washes Laodiceæ (Pliny).—Another of Bæotia, which running from mount Cithæron, and watering the territory of Thebes, separates it from the territory of Platea, and falls with an east course into the Euripus, at Tanagra. On this river Adratus king of Sicily built a temple to Nemesis, thence

called *Adrasieia*. From this river Thebae came to be surnamed *Aspider*, (Strabo). It is now called *Asopo*. A third Asopus, a river of Peloponnesus, which runs by Sicyon, (Strabo); and with a north-west course falls into the Sinus Corinthiacus, to the west of Corinth.—A fourth, a small river of the Locri Epine-midii, on the borders of Thessaly, (Pliny); rising in Mount Oeta, and falling into the Sinus Maliacus.

ASOPUS, a town of Laconica, (Pausanias); on the Sinus Laconicus, with a port in a peninsula, between Boe to the east, and the mouth of the Eurotas to the west. The citadel only remains standing, now called by the sailors *Castel Rampano*.

ASOW, a celebrated and important fortress of Russia, once a place of considerable trade, but now demolished. It was situated in the district of Bachmut, near the place where the Greeks many centuries ago built the city of Tanais, which was very famous for its trade, and underwent many vicissitudes. The Genoese, who settled a trade with Russia soon after the discovery of Archangel by Captain Chancellor, became masters of this place, and gave it the name of *Tana*, or *Catana*; but the Tartars, who were very powerful in these parts, seem to have been in possession of it long before; for, as Busching informs us, there are Asow coins yet extant, on which is the name of *Taktamysy-Kan*. From the Genoese it fell into the hands of the Turks, lost its trade, and became an inconsiderable town. In 1637, it was taken by the Cossacks, who defended it against the Turks in 1641, and next year set fire to it, and blew it up. The Turks rebuilt it with strong fortifications. The Russians laid claim to it in 1672, and took it in 1696; but, by the treaty of Pruth in 1711, it was restored to the Turks. In 1736, the Russians became masters of Asow; but by the treaty of Belgrade they were obliged to relinquish it, and entirely destroy the place.

ASP, in natural history, a small poisonous kind of serpent, whose bite gives a speedy but easy death. It is said to be thus denominated from the Greek *ασπίς*, *shield*, in regard to the manner of its lying convolved in a circle, in the centre of which is the head, which it exerts, or raises, like the umbo or umbilicus of a buckler. This species of serpent is very frequently mentioned by authors; but so carelessly described, that it is not easy to determine which, if any of the species known at present, may properly be called by this name. It is said to be common in Africa, and about the banks of the Nile; and Bellonius mentions a small species of serpent which he had met with in Italy, and which had a sort of callous excrescence on the forehead, which he takes to have been the aspis of the ancients. It is with the asp that Cleopatra is said to have dispatched herself, and prevented the designs of Augustus, who intended to have carried her captive to adorn his triumphal entry into Rome. But the fact is contested: Brown places it among his vulgar errors. The indications of that queen's having used the ministry of the asp, were only two almost insensible pricks found in her arm. In reality, Plutarch says, it is unknown what death she died of.

Lord Bacon makes the asp the least painful of all the instruments of death: he supposes it to have an affinity to opium, but to be less disagreeable in its operation: Which, however, does not so well agree with

the description of the symptoms given by Dioscorides and others; who inform us, that the bite is followed by a stupor of the whole body, paleness, coldness of the forehead, continual yawning, nictitation of the eyelids, inclination of the neck, heaviness of the head, sinking into a profound sleep, and lastly convulsions.

The ancients had a plaster called *di horridum*, made of this terrible animal, of great efficacy as a discutient of strumæ, and other indurations, and used likewise against pains of the gout. The flesh and skin, or exuvia, of the creature, had also their share in the ancient materia medica.

ASPA, a town of Parthia, (Ptolemy); now *Ispahan**, (Holtzenius). In Ptolemy the latitude seems to agree, being 33°; but whether the longitude does, is a question. E. Long. 51°, Lat. 32. 30.

ASPALATHUS, AFRICAN BROOM; a genus of the decandria order, belonging to the diadelphia class of plants. Of this genus there are 19 species; all of which are natives of warm climates, and must be preserved in stoves by those who would cultivate them here. They have no great beauty, nor other remarkable property; which renders a particular description of them needless.

ASPARAGUS, SPARAGUS, SPERAGE, or SPARROW-GRASS; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. Of this genus there are ten species; but the only one cultivated in the gardens is that with an upright herbaceous stalk, bristly leaves, and equal stipula, or the common asparagus. The other species are kept only in the gardens of the curious for the sake of variety.

Culture. The garden asparagus is with great care cultivated for the use of the table. The propagation of this useful plant is from seed; and as much of the success depends upon the goodness of the seed, it is much better to save it than to buy it at the shops. The manner of sowing it is this: Mark with a stick some of the fairest buds; and when they are run to berry, and the stalks begin to dry and wither, cut them up; rub off the berries into a tub, and, pouring water upon them, rub them about with your hands; the husks will break and let out the seed, and will swim away with the water in pouring it off; so that in repeating this two or three times, the seeds will be clean washed, and found at the bottom of the tub. These must be spread on a mat to dry, and in the beginning of February must be sown on a bed of rich earth. They must not be sown too thick, and must be trod into the ground, and the earth raked over them smooth: the bed is to be kept clear of weeds all the summer; and in October, when the stalks are withered and dry, a little rotten dung must be spread half an inch thick over the whole surface of the bed. The spring following, the plants will be fit to plant out for good; the ground must therefore be prepared for them by trenching it well, and burying a large quantity of rotten dung in the trenches, so that it may lie at least six inches below the surface of the ground: when this is done, level the whole plot exactly, taking out all the loose stones. This is to be done just at the time when the asparagus is to be planted out; which must be in the beginning of March, if the soil is dry, and the season forward; but in a wet soil, it is better to wait till the beginning of April, which is about the season that the plants are beginning

* See *Ispahan*.

Asparagus.

Asper
Asperula.

ning to shoot. The season being now come, the roots must be carefully taken up with a narrow-pronged dung-fork, shaking them out of the earth, separating them from each other, and observing to lay all their heads even, for the more convenient planting them, which must be done in this manner. Lines must be drawn, at a foot distance each, straight across the bed; these must be dug into small trenches of six inches deep, into which the roots must be laid, placing them against the sides of the trench with their buds in a right position upwards, and so that, when the earth is raked over them, they may be two inches under the surface of the ground. Between every four rows a space of two feet and a half should be left for walking in, to cut the asparagus. When the asparagus is thus planted, a crop of onions may be sown on the ground, which will not at all hurt it. A month after this, the asparagus will come up, when the crop of onions must be thinned, and the weeds carefully cleared away. About August the onions will be fit to pull up. In October following, cut off the shoots of the asparagus within two inches of the ground, clear well all weeds away, and throw up the earth upon the beds, so as to leave them five inches above the level of the alleys. A row of colworts may be planted in the middle of the alleys, but nothing must be now sown on the beds. In the spring the weeds must be hoed up, and all the summer the beds kept clear of weeds. In October they must be turned up, and earthed again, as the preceding season. The second spring after planting, some of the young asparagus may be cut for the table. The larger shoots should only be taken, and these should be cut at two inches under ground, and the beds every year managed as in the second year. But as some people are very fond of early asparagus, the following directions are given by which it may be obtained any time in winter: Plant some good roots at one year old in a moist rich soil, about eight inches apart; the second and third years after planting, they will be ready to take up for the hot-beds; these should be made pretty strong, about three feet thick, with new stable-dung that has fermented a week or more; the beds must be covered with earth six inches thick; then against a ridge made at one end, begin to lay in your plants, without trimming or cutting the fibres, and between every row lay a little ridge of fine earth, and proceed thus till the bed is planted; then cover the bed two inches thick with earth, and encompass it with a straw-band, and in a week, or as the bed is in the temper, put on the frames and glasses, and lay on three inches thick of fresh earth over the beds, and give them air and add fresh heat to them as it requires. These beds may be made from November till March, which will last till the natural grass comes in.

Medicinal Uses. The roots have a bitterish mucilaginous taste, inclining to sweetness; the fruit has much the same kind of taste; the young shoots are more agreeable than either. Asparagus promotes appetite, but affords little nourishment. It gives a strong ill smell to the urine in a little time after eating it, and for this reason chiefly is supposed to be diuretic: it is likewise esteemed aperient and deobstruent; the root is one of the five called *opening roots*. Some suppose the shoots to be most efficacious; others the root; and others the bark of the root. Stahl is of opinion that

none of them have any great share of the virtues usually ascribed to them. Asparagus appears from experience to contribute very little either to the exciting of urine when suppressed, or increasing its discharge; and in cafes where aperient medicines generally do service, this has little or no effect.

ASPECT, in astronomy, denotes the situation of the planets and stars with respect to each other.

There are five different aspects. 1. Sextile aspect is when the planets or stars are 60° distant, and marked thus ✱. 2. The quartile, or quadrature, when they are 90° distant, marked □. 3. Trine, when 120° distant, marked Δ. 4. Opposition, when 180° distant, marked 8. And, 5. Conjunction, when both in the same degree, marked ∅.

Kepler, who added eight new ones, defines aspect to be the angle formed by the rays of two stars meeting on the earth, whereby their good or bad influence is measured: for it is to be observed, that these aspects being first introduced by astrologers, were distinguished into benign, malignant, and indifferent; the quartile and opposition being accounted malign; the trine and sextile, benign or friendly; and the conjunction, indifferent.

ASPEN-TREE, in botany. See POPULUS.

ASPER, in grammar, an accent peculiar to the Greek language, marked thus (´); and importing, that the letters over which it is placed ought to be strongly aspirated, or pronounced as if an *h* were joined with them.

ASPER, or *Aspre*, in commerce, a Turkish coin, three of which make a medine. See MEDINE.

ASPERA ARTERIA, in anatomy, the same with the windpipe or trachea. See ANATOMY, n° 380.

ASPERIFOLIATE, or ASPERIFOLIOLUS, among botanists, such plants as are rough-leaved, having their leaves placed alternately on their stalks, and a monopetalous flower divided into five parts.—They constitute an order of plants in the *Fragmenta methodi naturalis* of Linnaeus, in which are these genera, *viz.* tournefortia, cerinthe, symphytum, pulmonaria, anchusa, lithospermum, myosotis, heliotropium, cynoglossum, asperugo, lycopsis, echium, borrago: *magis minusve cleraceae, mucilaginosae, & glutinosae sunt.* Lin. In the present system, these are among the pentandria monogynia.

ASPERITY, the inequality of the surface of any body, which hinders the hand from passing over it freely.—From the testimony of some blind persons, it has been supposed that every colour hath its particular degree of asperity: though this has been denied by others. See the article BLIND.

ASPEROSA, a town of Turkey, in Europe; it is a bishop's see, situated on the coast of the Archipelago. E. Long. 25. 20. N. Lat. 40. 58.

ASPERUGO, SMALL WILD BUGLOSS, in botany; a genus of the pentandria monogynia class. There are two species, *viz.* the procumbens, or wild bugloss, a native of Britain; and the *Ægyptiaca*, a native of Egypt. Horses, goats, sheep and swine eat the first species; cows are not fond of it.

ASPERULA, WOODROOF; a genus of the monogynia order, belonging to the hexandria class of plants, of which there are two species, the *cynanchica* and the *odorata*. Both of them grow wild in Britain, fo

Asphaltites. are seldom admitted into gardens. The first is found on chalky hills. The latter is a low umbelliferous plant, growing wild in woods and copses, and flowering in May. It has an exceeding pleasant smell, which is improved by moderate exsiccation; the taste is sub saline, and somewhat austere. It imparts its flavour to vinous liquors. *Asperula* is supposed to attenuate viscid humours, and strengthen the tone of the bowels; it is recommended in obstructions of the liver and biliary ducts, and by some in epilepsies and palsies; modern practice has nevertheless rejected it. The smell of it is said to drive away ticks and other insects. The roots of the first are used in Sweden to dye red.

ASPHALTITES, so called from the great quantity of bitumen it produces; called also the *dead sea*; and from its situation, the *east sea*; the *salt sea*, the *sea of Sodom*, the *sea of the desert*, and *sea of the plain*, by the sacred writings: A lake of Judea. Many things have been said and written of this famed, or, if they were indeed true, rather infamous lake; such as that it arose from the submerison of the vale of Siddim, where once stood, as is commonly reported, the three cities which perished in the miraculous conflagration, with those of Sodom and Gomorrah, for their unnatural and detestable wickedness: on which account this lake has been looked upon as a lasting monument of the just judgement of God, to deter mankind from such abominations. Hence it is added, that the waters of the lake are so impregnated with salt, sulphur, and other bituminous stuff, that nothing will sink or live in it; and that it casts such stench and smoke, that the very birds die in attempting to fly over it. The description likewise of the apples that grew about it, fair without, and only ashes and bitterness within, were looked upon as a farther monument of God's anger. So likewise the description which many travellers give not only of the lake, but of all the country round about, of the whole appearing dreadful to behold, all sulphureous, bituminous, stinking, and suffocating; and lastly, what hath been farther affirmed of the ruins of the five cities being still to be seen in clear weather, and having been actually seen in these later times; all these surprising things, and ill-grounded notions, though commonly, and so long, received among Christians, have been of late so much exploded, not only by the testimony of very credible witnesses, but even by arguments drawn from scripture, that we must give them up as inventions, unless we will suppose the face and nature of all these things to have been entirely changed. Those, in particular, of bodies not sinking in the water, and of birds being stifled by the exhalations of it, appear now false in fact. 'Tis true, the quantity of salt, alum, and sulphur, with which it is impregnated, render it so much specifically heavier (Dr Pococke says one-fifth) than fresh water, that bodies will not so easily sink; yet that author, and others, assure us, they have swam and dived in it; and, as to the birds, we are told likewise, that they will fly over it without any harm. To reconcile these things with the experiments which Pliny † tells us had been made by Vespasian, is impossible, without supposing that those ingredients have been since much exhausted, which is not at all improbable; such quantities of them, that is, of the bitumen and salt, having been all along, and being still taken off, and such streams of fresh water con-

tinually pouring into it, as may reasonably be supposed to have considerably diminished its gravity and denseness. For, with respect to its salt, we are told, the Arabs made quantities of it from that lake, in large pits about the shore, which they fill with that water, and leave to be crystallized by the sun. This salt is in some cases much commended by Galen, as very wholesome, and a strengthener of the stomach, &c. on account of its unpleasant bitterness.

What likewise relates to the constant smoke ascending from the lake, its changing the colour of its water three times a-day, so confidently affirmed by Josephus † and other ancients, and confirmed by prince Radzville and other moderns, who pretend to have been eye-witnesses of it, is all now in the same manner exploded by others of more modern date, and of at least equal candor. The unhealthiness of the air about the lake was affirmed by Josephus and Pliny, especially on the west: the monks that live in the neighbourhood confirm the same, and would have dissuaded Dr Pococke from going to it on that account; and, as he ventured to go and bathe in it, and was, two days after, seized with a dizziness, and violent pain in the stomach which lasted near three weeks, they made no doubt but it was occasioned by it; and he doth not seem to contradict them. As to the water, it is, though clear, so impregnated with salt, that those who dive into it, come out covered with a kind of saline matter. There is one remarkable thing relating to this lake, generally agreed on by all travellers and geographers; viz. that it receives the waters of Jordan, a considerable river, the brooks of Jabok, Kishon, Arnon, and other springs which flow into it from the adjacent mountains, and yet never overflows, tho' there is no visible way to be found by which it discharges that great influx. The common opinion is, that it hath some subterraneous vent, either into the Mediterranean, or the Red sea; but Dr Shaw hath endeavoured to account for it in the same ingenious way as Dr Halley had done by the Mediterranean, that is, by exhalation, without having recourse to any other solution. It is inclosed on the east and west with exceeding high mountains, many of them craggy, and dreadful to behold; on the north it has the plain of Jericho; or, if we take in both sides of the Jordan, it has the Great Plain, properly so called, on the south; which is open, and extends beyond the reach of the eye. Josephus gives this lake 580 furlongs in length, from the mouth of the Jordan to the town of Segor, on the opposite end; that is, about 22 leagues; and about 150 furlongs, or five leagues, in its largest breadth: but our modern accounts commonly give it 24 leagues in length, and six or seven in breadth. On the west side of it is a kind of promontory, where they pretend to show the remains of Lot's metamorphosed wife. Josephus says it was still standing in his time; but when prince Radzville inquired after it, they told him there was no such salt pillar or statue to be found in all that part. However, they have found means, about a century after him, to recover, as they pretended to assure Mr Maundrell, a block or stump of it, which may in time grow up, with a little art, into its ancient bulk.

It is to be observed here, that the name of *Dead sea* is not to be found in the sacred writings, but hath been given to this lake because no creature will live in it, on account

† *Bel. Jud.*
lib. v. cap. 5.

† *Nat. Hist.*
lib. v.
cap. 15.

Asphaltites. account of its excessive saltiness, or rather bituminous quality; for the Hebrews rank sulphur, nitre, and bitumen, under the general name of salt. However, some late travellers have found cause to suspect the common report of its breeding no living creature; one of them having observed, on the shore, two or three shells of fish like those of an oyster, and which he supposes to have been thrown up by the waves, at two hours distance from the mouth of the Jordan, which he there takes notice of, lest they should be suspected to have been brought into the lake by that way. And Dr Pococke, tho' he neither saw fish nor shells, tells us, on the authority of a monk, that some sort of fish had been caught in it; and gives us his opinion, that as so many sorts live in salt-water, some kind may be so formed as to live in a bituminous one.

It is on account of this bitumen that it hath had the name of *Asphaltite Lake*, it being reported to have thrown up great quantities of that drug, which was much in use among the Egyptians, and other nations, for embalming of dead bodies. Josephus assures us, that in his days it rose in lumps as big as an ox without its head, and some even larger. But, whatever it may have formerly done, we are assured by Mr Maundrell and others, that it is now to be found but in small quantities along the shore, though in much greater near the mountains on both sides the lake. But the contrary is since affirmed by two or more late* travellers, the one of whom tells us, that it is observed to float on the surface of the water, and to come on the shore, after windy weather, where the Arabians gather it, and put it to all the uses that common pitch is used for, even in the compositions of some medicines: and another† tells us, he was there informed, that it was raised at certain times from the bottom, in large hemispheres, which, as soon as they touch the surface, and are acted upon by the external air, burst at once, with great noise and smoke, like the *pulvis fulminans* of the chemists, dispersing themselves about in a thousand pieces. From both these judicious authors we may conclude the reason of Mr Maundrell's mistake, both as to the lake's throwing it up only on certain seasons (that reverend gentleman might chance to be there at the wrong time); and likewise as to his not observing it about the shores, seeing the Arabs are there ready to gather it as soon as thrown up: all of them describe it as resembling our black pitch, so as not to be distinguished from it but by its sulphureous smoke and stench when set on fire; and it hath been commonly thought to be the same with that which our druggists sell under the name of *bitumen Judaicum*, or *Jewish pitch*, though we have reason to think that this last is factitious, and that there is now none of the right asphaltum brought from Judea.

It hath, moreover, been confounded with a sort of blackish combustible stone thrown on the shore, and called by some *Moses's stone*, which, being held in the flame of a candle, will soon burn, and cast a smoke and intolerable stench; but with this extraordinary property, that though it loses much of its weight and colour, it becoming in a manner white, yet it diminishes nothing of its bulk. But these, Dr Pococke tells us, are found about two or three leagues from the shore. He concludes, however, from it, that a *stratum* of that stone under the lake is probably one part of the matter that feeds the subterraneous fire, and

causes the bitumen to boil up out of it.

ASPHALTUM, BITUMEN JUDAICUM, or JEW'S PITCH, is a light solid bitumen, of a dusky colour on the outside, and a deep shining black within; of very little taste; and having scarcely any smell, unless heated, when it emits a strong pitchy one. It is found in a soft or liquid state on the surface of the Dead sea, and by age grows dry and hard. The same kind of bitumen is met with likewise in the earth, in other parts of the world, in China, America, and in some places of Europe, as the Carpathian hills, France, Neufchatel, &c. There are several kinds of Jews pitch in the shops, but none of them are the genuine sort, and have little other title to their name than their being artificially compounded by Jews; and as they are a medley of we know not what ingredients, their medicinal use begins to be deservedly laid aside, notwithstanding the discutient, resolvent, pectoral, and other virtues, attributed to this bitumen by the ancients. The true asphaltum was formerly used in embalming the bodies of the dead. The thick and solid asphalta are at present employed in Egypt, Arabia, and Persia, as pitch for ships; as the fluid ones, for burning in lamps, and for varnishes. Some writers relate, that the walls of Babylon, and the temple of Jerusalem, were cemented with bitumen instead of mortar. Thus much is certain, that a true natural bitumen, that for instance which is found in the district of Neufchatel, proves an excellent cement for walls, pavements, and other purposes, uncommonly firm, very durable in the air, and not penetrable by water. The watch and clock makers use a composition of asphaltum, fine lamp-black, and oil of spike or turpentine, for drawing the black figures on dial-plates: this composition is prepared chiefly by certain persons at Augsbourg and Nuremberg. See the preceding article.

ASPHODELUS, ASPHODEL, or KING'S SPEAR; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. Of this genus botanical writers enumerate five species. 1. The luteus, or common yellow asphodel, hath roots composed of many thick fleshy fibres, which are yellow, and joined into a head at the top; from whence arise strong round single stalks near three feet high, garnished on the upper part with yellow star-shaped flowers, which appear in June, and the seeds ripen in autumn. 2. The ramosus, or branching asphodel, hath roots composed of fleshy fibres, to each of which is fastened an oblong bulb as large as a small potato; the leaves are long and flexible, having sharp edges; between these come out the flower-stalks, which arise more than three feet high, sending forth many lateral branches. The upper parts of these are adorned with many white star-shaped flowers, which grow in long spikes flowering gradually upward. They come out in the beginning of June, and the seeds ripen in autumn. 3. The ramosus, or unbranched asphodel, hath roots like the second, but the leaves are longer and narrower; the stalks are single, never putting out any side-branches. The flowers appear at the same time with the former, are of a purer white, and grow in longer spikes. 4. The albus, with keel-shaped leaves, hath roots composed of smaller fibres than the two last, nor are the knobs at bottom half so large; the leaves are long, almost triangular, and hollow

* Pococke's Travels, p. 56.

† Shaw's Travels, p. 374.

Asphurelata like the keel of a boat; the stalks seldom rise above two feet high, and divide into several spreading branches; these are terminated by loose spikes of white flowers smaller than those of the former. 5. The stulosus, or annual branching spiderwort, hath roots composed of many yellow fleshy fibres: the leaves are spread out from the crown of the root, close to the ground, in a large cluster; these are convex on their under side, but plain above. The flower-stalks rise immediately from the root, and grow about two feet high, dividing into three or four branches upward, which are adorned with white starry flowers, with purple lines on the outside. These flower in July and August, and their seeds ripen in October.

Culture. The way to increase these plants is by parting their roots in August, before they shoot up their fresh green leaves. They may also be raised from seeds sown in August; and the August following the plants produced from these may be transplanted into beds, and will produce flowers the second year. They must not be planted in small borders, among tender flowers; for they will draw away all the nourishment, and starve every thing else.

ASPHURELATA, in natural history, are semi-metallic fossils, fusible by fire, and not malleable in their purest state, being in their native state intimately mixed with sulphur and other adventitious matter, and reduced to what are called *ores*.

Of this series of fossils there are only five bodies, each of which makes a distinct genus; viz. antimony, bismuth, cobalt, zinc, or quicksilver.

ASPIQUETA (Martin de), commonly called the *Doctor of Navarre*, or *Doctor Navarrus*; was descended of a noble family, and born the 13th of December 1491, at Varasayn, a small city of Navarre, not far from Pampeluna. He entered very young into the monastery of Regular canons at Roncevaux, where he took the habit, which he continued to wear after he left the convent. He studied classical learning, natural and moral philosophy, and divinity, at Alcala, in New Castile, adopting chiefly the system of Petrus Lombardus, commonly called the *Master of the Sentences*. He applied to the study of the law at Ferrara, and taught it with applause at Toulouse and Cahors. After being first professor of canon law at Salamanca for 14 years, he quitted that place to be professor of law at Coimbra, with a larger salary. The duties of this office he discharged for the space of 20 years, and then resigned it to retire into his own country, where he took care of his nieces, the daughters of his deceased brothers. Having made a journey to Rome, to plead the cause of Bartholomeo de Caranza archbishop of Toledo, who had been accused of heresy before the tribunal of the inquisition in Spain, and whose cause was, by the Pope's order, to be tried in that city, Aspiqueta's writings, which were well known, procured him a most honourable reception. Pope Pius V. made him assistant to cardinal Francis Aciat, his vice-penitentiary; and Gregory XIII. never passed by his door without calling for him, and stopped sometimes a whole hour to talk with him in his retreat. His name became so famous, that even in his lifetime the highest encomium on a learned man was to call him a *Navarrus*. He was consulted as an oracle. By temperance he prolonged his life to a great length. His economy enabled him to give

substantial proofs of his charity. Being very old, he used to ride on a mule through the city, and relieved all the poor he met; to which his mule was so well accustomed, that it stopped of its own accord at the sight of every poor man, till its master had relieved him. He refused several honourable posts in church and state, that he might have leisure to correct and improve the works he had already written, and compose others. He died at the age of 94, on the 21st of June 1586. He wrote a vast number of treatises, all which are either on morality or canon law.

ASPIRATE, in grammar, denotes words marked with the spiritus asper. See **ASPER**.

ASPIRATION, among grammarians, is used to denote the pronouncing a syllable with some vehemence.

ASPLENIUM, **CETERACH**; a genus of the order of filices, belonging to the cryptogamia class of plants; of which there are seven species, but only two are natives of Britain. They grow upon old walls or moist rocks; one is called *scolopendrium*, or *hart's tongue*; the other is properly *ceterach*, also called *spelenwort*. It has an herbaceous, somewhat mucilaginous, roughish taste: it is recommended as a pectoral, and for promoting urine in nephritic cases. The virtue which it has been most celebrated for is that which it has the least title to, viz. diminishing the spleen.

ASS, in zoology, is ranked as a species of equus, or horse. See **EQUUS**.

Coronation of the Ass, in antiquity, was a part of the ceremony of the feast of Vesta, wherein the bakers put bread crowns on the heads of these quadrupeds; *Ecce coronatis panis dependet affellus* *. Hence, in an ancient calendar, the ides of June are thus denoted; *Festum est vi. 311. Vesta. Asinus coronatur!*—This honour, it seems, was done the beast, because, by its braying, it had saved Vesta from being ravished by the Lampaeacan dog. Hence the formula, *Vesta delictum est asinus*.

ASSAI, in music, signifies quick; and, according to others, that the motion of the piece be kept in a middle degree of quickness or slowness. *As, assai allegro, assai presto*. See **ALLEGRO** and **PRESTO**.

ASSANCALA, a strong town in Armenia, near the river Arras, in the road between Erzerum and Erivan, and noted for its hot baths. It stands on a high hill; the walls are built in a spiral line all round the rock, and strengthened with square towers. The ditches are about two fathoms over, cut out of hard rock. E. Long. 41. 30. N. Lat. 39. 46.

ASSANCHIF, a town of Asia, in Diarbekir, seated on the river Tigris. E. Long. 42. 30. N. Lat. 37. 20.

ASSARIUM, in antiquity, denotes a small copper coin, being a part or diminutive of the *as*. The word *assariolus* is used by Suidas indifferently with *ασκαριον* and *ασμακον* to denote a small piece of money; in which he is followed by Cujacius, who defines *assariolus* by *Minimus aris nummus*. We find mention of the assarium in the gospel of St Matthew, chap. x. verse 29.

ASSARON, or **OMER**, a measure of capacity, in use among the Hebrews, containing five pints. It was the measure of manna which God appointed for every Israelite.

ASSASSIN, a person who kills another by attacking him at some disadvantage. It is also meant of one who hires himself to murder a person, in order to revenge the

Aspire
1
Aspiscin.

Assassins. the quarrel of another.

ASSASSINS, a tribe or clan in Syria, called also *Imachiens* and *Batanists*. These people probably owed their origin to the Karmatians, a famous heretical sect among the Mahometans, who settled in Persia about the year 1090, whence, in process of time, they sent a colony into Syria, where they became possessed of a considerable tract of land among the mountains of Lebanon, extending itself from the neighbourhood of Antioch to Damascus.

The first chief and legislator of this remarkable tribe appears to have been Hassan Sabah, a subtle impostor, who by his artifices made fanatical and implicit slaves of his subjects. Their religion was compounded of that of the Magi, the Jews, the Christians, and the Mahometans : but the capital article of their creed was to believe that the Holy Ghost resided in their chief ; that his orders proceeded from God himself, and were real declarations of his divine pleasure. To this monarch the orientals gave the name of *Scheik* : but he is better known in Europe by the name of the *Old Man of the Mountain*. His dignity, instead of being hereditary, was confirmed by election ; where merit, that is, a superior multiplicity and enormity of crimes, was the most effectual recommendation to a majority of suffrages.

This chief, from his exalted residence on the summit of mount Lebanon, like a vindictive deity, with the thunderbolt in his hand, sent inevitable death to all quarters of the world ; so that from one end of the earth to the other, Khalifs, Emperors, Sultans, Kings, Princes, Christians, Mahometans, and Jews, every nation and people, execrated and dreaded his sanguinary power, from the strokes of which there was no security. At the least suggestion or whisper that he had threatened the death of any potentate, all immediately doubled their guards, and took every other precaution in their power. It is known that Philip Augustus king of France, on a premature advice that the Scheik intended to have him assassinated, instituted a new body-guard of men distinguished for their activity and courage, called *sergens d'Armes*, with bras clubs, bows and arrows ; and he himself never appeared without a club, fortified either with iron or gold. Most sovereigns paid feckly a pension to the Scheik, however scandalous and derogatory it might be to the lustre of majesty, for the safety of their persons. The Knights Templars alone dared to defy his secret machinations and open force. Indeed they were a permanent dispersed body, not to be cut off by massacres or assassinations.

This barbarous prince was furnished with resources unknown to all other monarchs, even to the most absolute despotic tyrant. His subjects would prostrate themselves at the foot of his throne, requesting to die by his hand or order, as a favour by which they were sure of passing into paradise. On them if danger made any impression, it was an emulation to press forward ; and if taken in any enterprise, they went to the place of execution with a magnanimity unknown to others. Henry count of Champagne, who married Isabella daughter of Amaury king of Jerusalem, passing over part of the territory of the Assassins in his way to Syria, and talking highly of his power, their chief came to meet him, "Are your subjects (said the old man of the mountain) as ready in their submission as mine?" and,

without flaying for an answer, made a sign with his hand, when ten young men in white, who were standing on an adjacent tower, instantly threw themselves down. 'On another occasion, Sultan Malek-Shah summoning the Scheik to submit himself to his government, and threatening him with the power of his arms, should he hesitate to comply ; the latter, very composedly turning himself towards his guards, said to one of them, "Draw your dagger, and plunge it into your breast ;" and to another, "Throw yourself headlong from yonder rock." His orders were no sooner uttered, than they were joyfully obeyed : and all the answer he deigned to give the sultan's envoy was, "Away to thy master, and let him know I have many thousand subjects of the same disposition." Men so ready to destroy themselves were equally alert and resolute in being the ministers of death to others. At the command of their sovereign, they made no difficulty of flaying any prince, even on his throne ; and being well versed in the different dialects, they conformed to the dress and even the external religion of the country, that they might with less difficulty strike the fatal blow required by their chief. With the Saracens they were Mahometans ; with the Franks, Christians ; in one place they joined with the Mamalukes ; in another, with the ecclesiastics or religious ; and under this disguise, seized the first opportunity of executing their sanguinary commission. Of this we meet with an instance in the history of Saladin, while he was besieging Manbege, the celebrated Hieropolis of antiquity. Being one day, with a few attendants, and they at some distance, reconnoitring the place for the better disposition of the attack, a man rushed on him with a dagger in his hand, and wounded him in the head ; but the sultan, as he was endeavouring to repeat his stroke, wrested the dagger from him, and, after receiving several wounds, laid him dead at his feet. Before the sultan had well recovered himself, a second encountered him to finish the treachery of the former ; but he met with the same fate : he was succeeded with equal fury by a third, who also fell by the hand of that magnanimous prince whom he was sent to assassinate. And it was observed, that these wretches dealt about their fruitless blows as they lay in the agonies of death. With such rapidity was this transacted, that it was over before Saladin's guards could come to his assistance. He retired to his tent, and in great perturbation throwing himself on his sofa ordered his servants to take a strict view of his household, and to call all suspected persons ; at the same time asking with great earnestness, "Of whom have I deserved such treacherous usage?" but it afterwards appeared, that these villains had been sent by the old man of the mountain ; of whom the vizir Kamschlegin had purchased the murder of Saladin, to free himself from so great a warrior whom he could not meet in the field. To animate them in their frantic obedience, the Scheik, before their departure on such attempts, used to give them a small fortale of some of the delights which he assured them would be their recompense in paradise. Delicious soporific drinks were given them ; and while they lay asleep, they were carried into beautiful gardens, where every allurements invited their senses to the most exquisite gratifications. From these seats of voluptuousness, inflamed with liquor and enthusiastic views of perpetual enjoyments,

they

Assassins.

Assault
||
Assembly.

they sallied forth to perform assassinations of the blackest dye.

This people once had, or at least they feigned to have, an intention of embracing the Christian religion. They reigned a long time in Persia, and on mount Lebanon. Hulaku, a khan of the mogul Tartars, in the year 655 of the Hegira, or 1254 of the Christian era, entered their country and dispossessed them of several places; but it was not till the year 1272 that they were totally conquered. This achievement was owing to the conduct and intrepidity of the Egyptian forces sent against them by the sultan Bibaris. It has, however, been thought that the Druses, who still reside among the eminences of mount Lebanon, and whose religion and customs are so little known, are a remnant of those barbarians.

ASSAULT, in law, is an attempt or offer to beat another, without touching him: as if one lifts up his cane or his fist in a threatening manner at another; or strikes at him, but misses him; this is an assault, *in-fultus*, which Finch describes to be "an unlawful setting upon one's person." This also is an inchoate violence, amounting considerably higher than bare threats; and therefore, though no actual suffering is proved, yet the party injured may have redress by action of *trespass vi et armis*, wherein he shall recover damages as a compensation for the injury.

ASSAULT, in the military art, a furious effort made to carry a fortified post, camp, or fortress, wherein the assailants do not screen themselves by any works: while the assault continues, the batteries cease, for fear of killing their own men.—*The enfans perdus* march first to the assault. See *ENFANS PERDUS*.

ASSAY, or **ESSAY**, in metallurgy. See **ESSAY**.

ASSAY-Master, an officer appointed by certain corporations to make a just essay of all gold and silver brought to him, and to make a true report thereof.

ASSAYING, or **ESSAYING**, of Ores. See **METALLURGY**.

ASSELYN (John), a famous Dutch painter, was born in Holland, and became the disciple of Isaiah Vandevelde, the battle-painter. He distinguished himself in history-paintings, battles, landscapes, animals, and particularly horses. He travelled into France and Italy; and was so pleased with the manner of Bamboccio, that he always followed it. He painted many pictures at Lyons, where he married the daughter of a merchant of Antwerp, and returned with her to Holland. Here he first discovered to his countrymen a fresh and clear manner of painting landscapes, like Claude Lorraine; upon which, all the painters imitated his style, and reformed the dark brown they had hitherto followed. Asselyn's pictures were so much admired at Amsterdam, that they sold there at a high price. He died in that city, in 1660. Twenty-four pieces of landscapes and ruins, which he painted in Italy, have been engraved by Perelle.

ASSEMBLAGE, the uniting or joining of things together; or the things themselves so united or joined. It is also used, in a more general sense, for a collection of various things so disposed and diversified, that the whole produces some agreeable effect.

ASSEMBLY, the meeting of several persons, in the same place, upon the same design.

ASSEMBLY, in the beau monde, an appointed meet-

ing of fashionable persons of both sexes, for the sake of play, gallantry, conversation, &c.

ASSEMBLY, in the military art, the second beating of a drum before a march; at which the soldiers strike their tents, roll them up, and stand to arms.

ASSEMBLIES of the clergy are called *convocations*, *synods*, *councils*; the annual meeting of the church of Scotland is called a *general assembly*.

ASSEMBLIES of the Roman people were called *comitia*.

ASSENS, a sea-port town of Denmark, in the island of Funen. It is the common passage from the duchy of Sleswick to Copenhagen. E. Long. 10. 30. N. Lat. 55. 15.

ASSENT, in a general sense, implies an agreement to something proposed or affirmed by another.

Royal Assent, the approbation given by the king to a bill in parliament, after which it becomes a law.

ASSER, John, (or **ASSERIUS MENEVENSI**, that is, *After of St David's*), bishop of Shireburn in the reign of Alfred the Great. He was born in Pembroke-shire, in South Wales; and educated in the monastery of St David's by the archbishop Asserius, who, according to Leland, was his kinsman. In this monastery he became a monk, and by his assiduous application soon acquired universal fame as a person of profound learning and great abilities. Alfred, the munificent patron of genius, about the year 880, sent for him to court. The king was then at Dean in Wiltshire. He was so charmed with Asser, that he made him his preceptor and companion. As a reward for his services, he appointed him abbot of two or three different monasteries; and at last promoted him to the episcopal see of Shireburn, where he died, and was buried, in the year 910. He was, says Pits, a man of a happy genius, wonderful modesty, extensive learning, and great integrity of life. He is said to have been principally instrumental in persuading the king to restore the university of Oxford to its pristine dignity and lustre.—He wrote, *De vita et rebus gestis Alfredi*, &c. Lond. 1574, published by archbishop Parker, in the old Saxon character, at the end of *Walsinghami hist.*—Francf. 1602, fol. Oxf. 1722, 8vo. Many other works are ascribed to this author by Gale, Bale, and Pits; but all doubtful.

ASSERTION, in the language of the schools, a proposition advanced by the assertor, who avows the truth of it, and is ready to defend it.

ASSESSOR, an inferior officer of justice, appointed chiefly to assist the ordinary judge with his opinion and advice.

ASSESSOR is also one who assesses, or settles taxes and other public duties.

ASSEVERATION, a positive and vehement affirmation of something.

ASSHETON (WILLIAM), doctor of divinity, and rector of Beckenham, in Kent, was born in the year 1641, and was educated at Brazen-nose college, Oxford. After entering into orders, he became chaplain to the duke of Ormond, and was admitted doctor of divinity in 1673. Soon after, he was nominated to a prebend in the church of York, presented to the living of St Antholin, London, and to the rectory of Beckenham in Kent. He was the first projector of the scheme for providing for clergymen's widows, and others, by a jointure payable out of the mercers company. He wrote several pieces against the Papists and

Assembly
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Assheton.

Dissenters,

Dissenters, and some devotional tracts. He died at Beckenham, in September 1711, in the 70th year of his age.

ASSIDEANS (or **CHASIDEANS**, from the Hebrew "*chasidim*," *merciful, pious*;) those Jews who resorted to Mattathias to fight for the law of God and the liberties of their country. They were men of great valour and zeal, having voluntarily devoted themselves to a more strict observation of the law than other men. For, after the return of the Jews from the Babylonish captivity, there were two sorts of men in their church; those who contented themselves with that obedience only which was prescribed by the law of Moses, and who were called *Zadikim*, i. e. the *righteous*; and those who, over and above the law, superadded the constitutions and traditions of the elders, and other rigorous observances: these latter were called *Chasidim*, i. e. the *pious*. From the former sprung the Samaritans, Sadducees, and Caraites; from the latter, the Pharisees and the Essenes.

ASSIDENT SIGNS, in medicine, are symptoms which usually attend a disease, but not always; hence differing from *pathognomic* signs, which are inseparable from the disease: *e. gr.* In the pleurisy, a pungent pain in the side; in an acute fever, difficulty of breathing, &c. collectively taken, are pathognomic signs; but that the pain extends to the hypochondrium or clavicle, or that the patient lies with more ease on one side than on the other, are *assident* signs.

ASSIENTO, a Spanish word signifying a *farm*, in commerce, is used for a bargain between the king of Spain and other powers, for importing negroes into the Spanish dominions in America, and particularly to Buenos Ayres. The first asiento was made with the French Guinea-company; and, by treaty of Utrecht, transferred to the English, who were to furnish 4800 negroes annually.

ASSIGN, in common law, a person to whom a thing is assigned or made over.

ASSIGNEE, in law, a person appointed by another to do an act, transact some business, or enjoy a particular commodity.

ASSIGNING, in a general sense, implies the making over the right of one person to another. In a particular sense, it signifies the pointing out of something; as, an error, false judgment, or waste.

ASSIGNMENT, the transferring the interest one has in a lease, or other thing, to another person.

ASSIMILATION, in physics, is that motion by which bodies convert other bodies related to them, or at least such as are prepared to be converted, into their own substance and nature. Thus, flame multiplies itself upon oily bodies, and generates new flame; air upon water, and produces new air; and all the parts, as well similar as organical, in vegetables and animals, first attract with some election or choice, nearly the same common or not very different juices for aliment, and afterwards assimilate or convert them to their own nature.

ASSISE, in old English law-books, is defined to be an assembly of knights and other substantial men, together with the justice, in a certain place, and at a certain time: but the word, in its present acceptation, implies a court, place, or time, when and where the writs and processes, whether civil or criminal, are de-

cided by judge and jury.

All the counties of England are divided into six circuits; and two judges are assigned by the king's commission, who hold their assises twice a-year in every county (except London and Middlesex, where courts of *nisi prius* are holden in and after every term, before the chief or other judge of the several superior courts; and except the four northern counties, where the assises are taken only once a-year) to try by a jury of the respective counties the truth of such matters of fact as are then under dispute in the courts of Westminster-hall. These judges of assise came into use in the room of the ancient justices in eyre, *justiciarii in itinere*; who were regularly established, if not first appointed, by the parliament of Northampton, *A. D.* 1176, 22 Hen. II. with a delegated power from the king's great court or *aula regia*, being looked upon as members thereof: and they afterwards made their circuit round the kingdom once in seven years for the purpose of trying causes. They were afterwards directed by *magna charta*, c. 12. to be sent into every county once a-year to take or try certain actions then called *recognitions* or *assise*; the most difficult of which they are directed to adjourn into the court of common pleas to be there determined. The itinerant justices were sometimes mere justices of assise, or of dower, or of gaol-delivery, and the like; and they had sometimes a more general commission, to determine all manner of causes, *justiciarii ad omnia placita*: but the present justices of assise and *nisi prius* are more immediately derived from the statute Westm. 2. 13 Edw. I. c. 30. explained by several other acts, particularly the statute 14 Edw. III. c. 16. and must be two of the king's justices of the one bench or the other, or the chief baron of the exchequer, or the king's sergeants sworn. They usually make their circuits in the respective vacations after Hilary and Trinity terms; assises being allowed to be taken in the holy time of Lent by consent of the bishops at the king's request, as expressed in statute Westm. 1. 3 Edw. I. c. 51. And it was also usual, during the times of Popery, for the prelates to grant annual licences to the justices of assise to administer oaths in holy times: for oaths being of a sacred nature, the logic of those deluded ages concluded that they must be of ecclesiastical cognizance. The prudent jealousy of our ancestors ordained that no man of law should be judge of assise in his own country: and a similar prohibition is found in the civil law, which has carried this principle so far, that it is equivalent to the crime of sacrilege, for a man to be governor of the province in which he was born, or has any civil connection.

The judges upon their circuits now sit by virtue of five several authorities. 1. The commission of the *peace*, in every county of the circuits; and all justices of the peace of the county are bound to be present at the assises; and sheriffs are also to give their attendance on the judges, or they shall be fined. 2. A commission of *oyer and terminer*, directed to them and many other gentlemen of the county, by which they are empowered to try treasons, felonies, &c. and this is the largest commission they have. 3. A commission of general *gaol-delivery*, directed to the judges and the clerk of assise associate, which gives them power to try every prisoner in the gaol committed for any offence whatsoever,

Affice
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Assonant.

Assumpt.

soever, but none but prisoners in the goal; so that one way or other they rid the goal of all the prisoners in it. 4. A commission of *affice*, directed to the judges and clerk of assize, to take assizes; that is, to take the verdict of a peculiar species of jury called an *affice*, and summoned for the trial of *landed* disputes. The other authority is, 5. That of *nisi prius*, which is a consequence of the commission of *affice*, being annexed to the office of those justices by the statute of Westm. 2. 13 Edw. I. c. 30. And it empowers them to try all questions of fact issuing out of the courts at Westminster, that are then ripe for trial by jury. The original of the name is this: all causes commenced in the courts of Westminster-hall are by the course of the courts appointed to be there tried, on a day fixed in some Easter or Michaelmas term, by a jury returned from the county wherein the cause of action arises; but with this proviso, *nisi prius iustitiarum ad assisas capiendas venerint; unless before the day prefixed the judges of assize come into the county in question.* This they are sure to do in the vacations preceding each Easter and Michaelmas term, and there dispose of the cause; which saves much expense and trouble, both to the parties, the jury, and the witnesses.

The word *assize* (from the French *assis*, seated, settled, or established, and formed of the Latin verb *assideo*, I sit by) is used in several different senses. It is sometimes taken for the sittings of a court; sometimes for its regulations or ordinances, especially those that fix the standard of weights and measures; and sometimes it signifies a jury, either because juries consisted of a fixed determinate number, or because they continued sitting till they pronounced their verdict. In Scots law, an assize or jury consists of fifteen sworn men (*jurators*) picked out by the court from a greater number, not exceeding 45, who have been summoned for that purpose by the sheriff, and given in list to the defender, at serving him with a copy of his libel.

ASSISIO, an episcopal town of Italy, in the duchy of Spoleto, built on the side of a very high mountain. The cathedral of St Francis is very magnificent, and composed of three churches one above another. E. Long. 13. 35. N. Lat. 43. 4.

ASSITHMENT, a wiregold, or compensation, by a pecuniary mulct; from the preposition *ad*, and the Sax. *sith*, *vicē: quod vicē supplicii ad expiandum delictum solvitur.*

ASSOCIATION, the act of associating, or constituting a society, or partnership, in order to carry on some scheme or affair with more advantage.—The word is Latin, *associatio*; and compounded of *ad*, to, and *socio*, to join.

ASSOCIATION of *Ideas*, is where two or more ideas constantly and immediately follow one another, so that the one shall almost infallibly produce the other *.

ASSOILZIE, in law, to absolve, or free.

ASSONANCE, in rhetoric and poetry, a term used where the words of a phrase, or a verse, have the same sound or termination, and yet make no proper rhyme. There are usually accounted vicious in English; though the Romans sometimes used them with elegance: as, *Militem comparavit, exercitum ordinavit, aciem iussit.*

ASSONANT RHYMES, is a term particularly applied to a kind of verses common among the Spaniards,

where a resemblance of sound serves instead of a natural rhyme. Thus, *ligera, cubierta, tierra, mesa*, may answer each other in a kind of *assonant* rhyme, having each an *e* in the penult syllable, and an *a* in the last.

ASSUMPSIT, in the law of England, a voluntary or verbal promise, whereby a person assumes, or takes upon him to perform or pay any thing to another.

A promise is in the nature of a verbal covenant, and wants nothing but the solemnity of writing and sealing to make it absolutely the same. If therefore it be to do any explicit act, it is an express contract, as much as any covenant: and the breach of it is an equal injury. The remedy indeed is not exactly the same: since, instead of an action of covenant, there only lies an action upon the case, for what is called an *assumpsit* or undertaking of the defendant; the failure of performing which is the wrong or injury done to the plaintiff, the damages whereof a jury are to estimate and settle. As, if a builder promises, undertakes, or assumes to Caius, that he will build and cover his house within a time limited, and fails to do it; Caius has an action on the case against the builder for this breach of his express promise, undertaking, or assumpsit; and shall recover a pecuniary satisfaction for the injury sustained by such delay. So also in the case of a debt by simple contract, if the debtor promises to pay it and does not, this breach of promise entitles the creditor to his action on the case, instead of being driven to an action of debt. Thus likewise a promissory note, or note of hand not under seal, to pay money at a day certain, is an express assumpsit; and the payee at common law, or by custom and act of parliament the indorsee, may recover the value of the note in damages, if it remains unpaid. Some agreements indeed, though never so expressly made, are deemed of so important a nature, that they ought not to rest in verbal promise only, which cannot be proved but by the memory (which sometimes will induce the perjury) of witnesses. To prevent which, the statute of frauds and perjuries, 29 Car. II. c. 3. enacts, that in the five following cases no verbal promise shall be sufficient to ground an action upon, but at the least some note or memorandum of it shall be made in writing, and signed by the party to be charged therewith: 1. Where an executor or administrator promises to answer damages out of his own estate. 2. Where a man undertakes to answer for the debt, default, or miscarriage, of another. 3. Where any agreement is made upon consideration of marriage. 4. Where any contract or sale is made of lands, tenements, or hereditaments, or any interest therein. 5. And lastly, where there is any agreement that is not to be performed within a year from the making thereof. In all these cases, a mere verbal assumpsit is void.

From these express contracts the transition is easy to those that are only implied by law. Which are such as reason and justice dictate, and which therefore the law presumes that every man has contracted to perform; and, upon this presumption, makes him answerable to such persons as suffer by his non-performance.

Thus, 1. If I employ a person to transact any business for me, or perform any work, the law implies that I undertook, or assumed to pay him so much as his labour deserved; and if I neglect to make him amends, he has a remedy for this injury by bringing his action

on

* See *Metaphysics*, sect. xxviii.

Assumpsit. on the case upon this implied assumpsit; wherein he is at liberty to suggest that I promised to pay him so much as he reasonably deserved, and then to aver that his trouble was really worth such a particular sum, which the defendant has omitted to pay. But this valuation of his trouble is submitted to the determination of a jury; who will assess such a sum in damages as they think he really merited. This is called an *assumpsit* on a *quantum meruit*.

2. There is also an implied assumpsit on a *quantum valebat*, which is very similar to the former; being only where one takes up goods or wares of a tradesman, without expressly agreeing for the price. There the law concludes, that both parties did intentionally agree that the real value of the goods should be paid; and an action on the case may be brought accordingly, if the vendee refuses to pay that value.

3. A third species of implied assumpsit is when one has had and received money belonging to another without any valuable consideration given on the receiver's part: for the law construes this to be money had and received for the use of the owner only; and implies that the person so receiving, promised and undertook to account for it to the true proprietor. And, if he unjustly detains it, an action on the case lies against him for the breach of such implied promise and undertaking; and he will be made to repair the owner in damages, equivalent to what he has detained in such violation of his promise. This is a very extensive and beneficial remedy, applicable to almost every case where the defendant has received money which *ex æquo et bono* he ought to refund. It lies for money paid by mistake, or on a consideration which happens to fail, or through imposition, extortion, or oppression, or where undue advantage is taken of the plaintiff's situation.

4. Where a person has laid out and expended his own money for the use of another at his request, the law implies a promise of repayment, and an action will lie on this assumpsit.

5. Likewise, fifthly, upon a stated account between two merchants, or other persons, the law implies that he against whom the balance appears has engaged to pay it to the other; though there be not any actual promise. And from this implication it is frequent for actions on the case to be brought, declaring that the plaintiff and defendant had settled their accounts together, *insum computassent*, (which gives name to this species of assumpsit); and that the defendant engaged to pay the plaintiff the balance, but has since neglected to do it. But if no account has been made up, then the legal remedy is by bringing a writ of *account de computo*; commanding the defendant to render a just account to the plaintiff, or shew the court good cause to the contrary. In this action, if the plaintiff succeeds, there are two judgements; the first is, that the defendant do account (*quod computet*) before auditors appointed by the court; and when such account is finished, then the second judgment is, that he do pay the plaintiff so much as he is found in arrears.

6. The last class of contracts, implied by reason and construction of law, arises upon this supposition, that every one who undertakes any office, employment, trust, or duty, contracts with those who employ or entrust him, to perform it with integrity, diligence, and skill: and, if by his want of either of those qualities any

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injury accrues to individuals, they have therefore their remedy in damages, by a special action on the case. A few instances will fully illustrate this matter. If an officer of the public is guilty of neglect of duty, or a palpable breach of it, of non-feasance or of mis-feasance; as, if the sheriff does not execute a writ sent to him, or if he wilfully makes a false return thereof; in both these cases, the party aggrieved shall have an action *on the case*, for damages to be assessed by a jury. If a sheriff or gaoler suffers a prisoner who is taken upon mesne process (that is, during the pendency of a suit) to escape, he is liable to an action *on the case*. But if, after judgment, a gaoler or a sheriff permits a debtor to escape, who is charged in execution for a certain sum; the debt immediately becomes his own, and he is compellable by action of *debt*, being for a sum liquidated and ascertained, to satisfy the creditor in his whole demand. An advocate or attorney that betray the cause of their client, or, being retained, neglect to appear at the trial, by which the cause miscarries, are liable to an action on the case, for a reparation to their injured client. There is also in law always an implied contract with a common inn-keeper, to secure his guest's goods in his inn; with a common carrier or barge-master, to be answerable for the goods he carries; with a common farrier, that he shoes a horse well, without laming him; with a common taylor, or other workman, that he performs his business in a workmanlike manner: in which if they fail, an action on the case lies to recover damages for such breach of their general undertaking. Also if an inn-keeper, or other victualler, hangs out a sign and opens his house for travellers, it is an implied engagement to entertain all persons who travel that way; and upon this universal *assumpsit* an action on the case will lie against him for damages, if he without good reason refuses to admit a traveller. In contracts likewise for sales, if the seller doth upon the sale warrant it to be good, the law annexes a tacit contract to this warranty, that if it be not so, he shall make compensation to the buyer: else it is an injury to good faith, for which an action on the case will lie to recover damages.

ASSUMPTION, a festival in the Romish church, in honour of the miraculous ascent of the Virgin Mary into heaven: the Greek church, who also observe this festival, celebrate it on the 15th of August with great ceremony.

ASSUMPTION, in logic, is the minor or second proposition in a categorical syllogism.

ASSUMPTION is also used for a consequence drawn from the propositions whereof an argument is composed.

ASSUMPTION, an island of North America, in the gulph of St Laurence, at the mouth of the great river of the same name. It is covered with trees. W. Long. 60. 40. N. Lat. 49. 30.

ASSUMPTION, a large and handsome town, of Proper Paraguay, on the river of the same name in South America. It is a bishop's see, is well peopled, and seated in a country fruitful in corn and fruits, whose trees are always green. There is likewise a quantity of pasture, and the air is temperate and salutary. W. Long. 60. 40. S. Lat. 34. 10.

ASSUMPTIVE ARMS, in heraldry, are such as a person has a right to assume, with the approbation of his sovereign, and of the heralds: thus, if a person, who

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has

Assump-
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Assump-
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Assurance has no right by blood, and has no coat of arms, shall captivate, in any lawful war, any gentleman, nobleman, or prince, he is, in that case, intitled to bear the shield of that prisoner, and enjoy it to him and his heirs for ever.

ASSURANCE, or **INSURANCE**, in commerce. See **INSURANCE**.

ASSUROR, a merchant, or other person, who makes out a policy of assurance, and thereby insures a ship, house, or the like.

ASSUS, *i*, feminine, (Strabo); *Assum*, or *Asson*, *i*, neuter, (Ptolemy); a town of Troas (though by others supposed to be of Myfia), and the same with Apollonia, (Pliny); but different from the Apollonia on the river Rhynadacus. Ptolemy places it on the sea-coast, but Strabo more inland; if he does not mean the head of an inland bay, as appears from Diodorus Siculus. It was a town of the Leleges, the country of Cleanthes the stoic philosopher, who succeeded Zeno; and is still called *Assus*. E. Long. 27. 30. N. Lat. 38. 30.

ASSYRIA. See **BABYLONIA**.

ASSYTHMENT. See **ASSITHMENT**.

ASTA, an inland town of Lignria, a colony, (Ptolemy); on the river Tanarus: now *Astii*. E. Long. 8. 15. Lat. 44. 40.

ASTA Regia, a town of Bætica, (Pliny); situated at that mouth of the Betis, which was choaked up with mud, to the north of Cadiz; 16 miles distant from the port of Cadiz, (Antonine). Its ruins shew its former greatness. Its name is Phœnician, denoting a *smith*, or arm of the sea, on which it stood. It is said to be the same with **XERA**; which see.

ASTABAT, a town of Armenia, in Asia, situated near the river Aras, 12 miles south of Nakhshivan. The land about it is excellent, and produces very good wine. There is a root peculiar to this country called *ronas*; which runs in the ground like liquorice, and serves for dyeing red. It is very much used all over the Indies, and for it they have a great trade. E. Long. 46. 30. N. Lat. 39. 0.

ASTAROTH, or **ASHTAROTH**, in antiquity, a goddess of the Sidonians.—The word is Syriac, and signifies *sheep*, especially when their udders are turgid with milk. From the fecundity of those animals, which in Syria continue to breed a long time, they formed the notion of a deity, whom they called *Asharoth*, or *Astarte*. See **ASTARTE**.

ASTAROTH, the royal residence of Og king of Bashan; whether the same with Astaroth Carnaim, is matter of doubt: if one and the same, it follows from Eusebius's account, that it lay in Bashan, and to the east of Jordan, because in the confines of Arabia.

ASTARTE, in Pagan mythology, (the singular of *Astaroth*), a Phœnician goddess*, called in Scripture the *queen of heaven*, and the *goddess of the Sidonians*.—Solomon, in compliment to one of his queens, erected an altar to her. In the reign of Ahab, Jezebel caused her worship be performed with much pomp and ceremony: she had 400 priests; the women were employed in weaving hangings or tabernacles for her; and Jeremiah observes, that “the children gathered the wood, the fathers kindled the fire, and the women kneaded the dough, to make cakes for the queen of heaven.”

ASTARTE, a city on the other side Jordan; one of

the names of Rabbath Ammon, in Arabia Petrea, (Stephanus).

ASTEISM, in rhetoric, a genteel irony, or handsome way of deriding another. Such, *e. gr.* is that of Virgil: *Qui Bavianum non edit, amet tua carmina, Mævi*, &c. Diomed places the characteristic of this figure, or species of irony, in that it is not gross and rustic, but ingenious and polite.

ASTELL (Mary), the great ornament of her sex, and country, was the daughter of — Astell, an opulent merchant at Newcastle upon Tyne, where she was born about the year 1668. She was educated in a manner suitable to her station; and, amongst other accomplishments, was mistress of the French, and had some knowledge of the Latin tongue. Her uncle, a clergyman, observing in her some marks of a promising genius, took her under his tuition, and taught her mathematics, logic, and philosophy. She left the place of her nativity when she was about 20 years of age, and spent the remaining part of her life at London, and at Chelsea. Here she pursued her studies with great assiduity, made great proficiency in the above-mentioned sciences, and acquired a more complete knowledge of many classic authors. Among these Seneca, Epictetus, Hierocles, Antoninus, Tully, Plato, and Xenophon, were her principal favourites.

Her life was spent in writing for the advancement of learning, religion, and virtue; and in the practice of those religious duties which she so zealously and pathetically recommended to others, and in which perhaps no one was ever more sincere and devout. Her sentiments of piety, charity, humility, friendship, and other Christian graces, were uncommonly refined and sublime; and religion sat gracefully upon her, unattended with any forbidding airs of mournfulness or gloom. Her mind was generally calm and serene; and her conversation was innocently facetious, and highly entertaining. She would say, “The good Christian only hath reason, and he always ought, to be cheerful;” and, “That dejected looks and melancholy airs were very unseemly in a Christian.” But these subjects she hath treated at large in some of her excellent writings.

She was remarkably abstemious; and seemed to enjoy an uninterrupted state of health, till a few years before her death; when, having one of her breasts cut off, it so much impaired her constitution, that she did not long survive it. This painful operation she underwent without discovering the least timidity, or so much as uttering a groan; and shewed the same resolution and resignation during her whole illness. When she was confined to her bed by a gradual decay, and the time of her dissolution drew near, she ordered her shroud and coffin to be made, and brought to her bed-side; and there to remain in her view, as a constant memento of her approaching fate, and to keep her mind fixed on proper contemplation. She died in the year 1731, in the 63^d year of her age, and was buried at Chelsea. She wrote, 1. A serious Proposal to the Ladies. 2. An Essay in Defence of the Female Sex. 3. Letters concerning the Love of God. 4. Reflections upon Marriage. 5. Moderation truly stated. 6. The Christian Religion, as professed by a Daughter of the Church of England; and some other works.

ASTER, **STARWORT**; a genus of the polygamia superflua order, belonging to the syngenesia class of plants;

Asteism
After.

* See Phœnicia.



Placé XLII.



Fig. 3.
ASTERIAS.

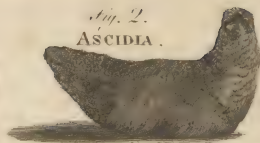


Fig. 2.
ASCIDIA.



Fig. 1.
ARDEA HERODIAS.

ASTERIAS



Fig. 4.



Fig. 7. ASTROITES.



Fig. 6.

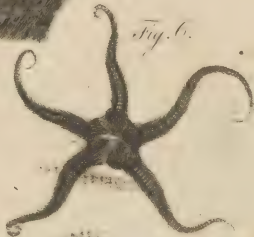


Fig. 5.



A Bell Sound.

After
||
Asteria.

plants; of which there are no less than 30 distinct species: but as none of them are possessed of any remarkable properties, we reckon a particular description unnecessary.

Culture. All the species of this genus may be raised from seed sown either in autumn or spring; but the greatest part of them being perennial plants, and increasing greatly at the roots, are generally propagated by parting their roots early in the spring, and they will grow in almost any soil or situation; and the larger sorts increase so fast, that, if not prevented, they will in a little time run over a large space of ground. They grow best in the shade; but the lower kinds do not run so much at the root, but should be taken up and transplanted every other year; which will make them produce much fairer flowers. Some few sorts, which are natives of warm climates, will require artificial heat to raise them, if not to preserve them.

ASTER, or *Stella Marina*, in zoology. See *ASTERIAS*.

ASTERABAD, a province in the north-east part of Persia, having Tabritan on the west, part of the Caspian Sea and part of Jorjan on the north, Korasan on the west, and Koumas on the south. It is a mountainous country, except near the banks of the rivers that almost surround it, where it is pleasant, and fruitful, producing grapes of a prodigious size. In other parts the soil is sandy and barren. Asterabad is the chief town, which gives name to a gulph in the Persian Sea, at the bottom of which it stands. E. Long. 54. 35. N. Lat. 36. 50.

ASTERIA, in zoology, a name by which some authors have called the *salco palumbarius*, or *goharuk* *.

* See *Falco*.

ASTERIA is also the name of a gem, usually called the *cat's eye*, or *oculus cati*. It is a very singular and very beautiful stone, and somewhat approaches to the nature of the opal, in having a bright enclouded colour, which seems to be lodged deep in the body of the stone, and shifts about, as it is moved, in various directions; but it differs from the opal in all other particulars, but, above all, in its want of the great variety of colours seen in that gem, and in its superior hardness. It is usually found between the size of a pea, and the breadth of a sixpence; and is almost always of a semicircular form, broad and flat at the bottom, and rounded and convex at the top; it is naturally smooth and polished, and is usually wore with its natural polish. It has only two colours, a pale brown and a white; the brown seeming the ground, and the white playing about in it, as the fire-colour in the opal. It is considerably hard, and will take a fine polish, but is usually worn with its native shape and smoothness. It is found in the East and West Indies, and in Europe. The island of Borneo affords some very fine ones, but they are usually small; they are very common in the sands of rivers in New Spain; and in Bohemia they are not unfrequently found immersed in the same masses of jasper with the opal.

ASTERIA is also the name of an extraneous fossil, called in English the *star-stone*. These fossils are small, short, angular or sulcated columns, between one and two inches long, and seldom above a third of an inch in diameter: composed of several regular joints; when separated, each resembles a radiated star. They are, not without reason, supposed to be a part of some sea-fish putrified, probably the *asterias*, or sea-star *. The

asteria is also called *asfritus*, *asfroites*, and *asferiscus*. They may be reduced to two kinds; those whose whole bodies make the form of a star; and those which in the whole are irregular, but are adorned as it were with constellations in the parts. Dr Lister, for distinction's sake, only gives the name *asteria* to the former sort, distinguishing the latter by the appellation of *asfroites*; other naturalists generally use the two indiscriminately. The *asteria* spoken of by the ancients appears to be of this latter kind. The quality of moving in vinegar, as if animated, is scarce perceivable in the *asfroites*, but is signal in the *asteria*. The former must be broken in small pieces before it will move; but the latter will move, not only in a whole joint, but in two or three knit together. The curious frequently meet with these stones in many parts of England: at Cleydon in Oxfordshire they are found rather larger than common, but of a softer substance; for, on being left a small space of time in a strong acid, they may easily be separated at the joints in small plates.

ASTERIAS, *STAR-FISH*, or *SEA-STAR*, in zoology, a genus of insects of the order of vermes molusca. It has a depressed body, covered with a coriaceous coat; is composed of five or more segments, running out from a central part, and furnished with numerous tentacula; and has the mouth in the centre.—The conformation of the mouth is this: the under part of each lobe runs towards a point with the rest at the centre of the body; and these several productions of the rays make a sort of lips, the ends of each of which are armed with a number of sharp teeth, which serve to take and convey the food into the body. From this mouth there goes a separate canal to all or many of the rays, which runs through their whole length, and becomes gradually narrower as it approaches the extremity. The tentacula resemble the horns of snails, but serve the animal to walk with. They are capable of being contracted or shortened: and it is only at the creature's moving that they are seen of their full length; at other times, no part of them is seen but the extremity of each, which is formed like a sort of button, being somewhat larger than the rest of the horn.

Most of the species of *asterias* are found in the British seas. 1. The glacialis, with five rays, depressed, broad at the base, yellow, and having a round striated operculum on the back, is the most common; it feeds on oysters, and is very destructive to the beds. 2. The clathrata, or cancellated sea-star, with five short thick rays, hirsute beneath, cancellated above, is found with the former, but more rare. 3. The oculata, with five smooth rays, dotted or punctured, is of a fine purple colour, and is found about Anglesea *. 4. The hispida, with five rays, broad, angulated at top, and rough with short bristles, is of a brown colour, and likewise found about Anglesea †. 5. The placenta, with five † Fig. 4. very broad and membranaceous rays, extremely thin and flat, is found about Weymouth ‡. 6. The sphaerulata, with a pentagonal indented body; a small globular bead between the base of each ray; the rays slender, jointed, taper, and hirsute on their sides; found off Anglesea *. 7. The caput medusae, or arborefcens sea-star, with five rays issuing from an angular body; the rays dividing into innumerable branches, growing slender as they recede from the base. These the animal, in swimming, spreads like a net to their full length

* See Plate
XLII. fig. 3.

* Fig. 6.

* See *Asterias*.

Asterias
||
Astracan.

length; and when he perceives any prey within them, draws them in again, thus catching it with all the dexterity of a fisherman. It is an inhabitant of every sea. 8. The decanemos, has ten very slender rays, with numbers of long beards on the sides; the body is small, and furrowed beneath with ten small filiform rays. It inhabits the western coasts of Scotland.— There are several other species mentioned by authors; some of them of 10, 12, 13, or even 14 rays.

Aristotle and Pliny called this genus *αστερον*, and *stella marina*, from their resemblance to the pictured form of the stars of heaven; and they asserted that they were so exceedingly hot, as instantly to consume whatsoever they touched.

The fossil world has been greatly enriched by the fragments and remains of the several pieces of star-fish, which have been converted into stones *.

ASTERIAS, the ancient name of the bittern †.

ASTERISK, a mark in form of a star (*), placed over a word or sentence, to refer the reader to the margin, or elsewhere, for a quotation, explanation, or the like.

ASTERIUS, or ASTURIUS, a Roman consul, in 449. We have under his name, A Conference on the Old and New Testament, in Latin verse: in which each strophe contains, in the first verse, an historical fact in the Old Testament; and in the second, an application of that fact to some point in the New.

ASTEROPODIUM, a kind of extraneous fossil, of the same substance with the asteria, or star-stones to which they serve as a base *.

ASTHMA. See the *Index* subjoined to MEDICINE.

ASTI, a city of Monterrat in Italy, seated on the Tanaro, and capital of the county of the same name. It is a bishop's see, and well fortified with strong walls and deep ditches; and is divided into the city, borough, citadel, and castle. There are a great many churches and convents, as well as other handsome buildings; and its territory is well watered, abounding with groves, pleasant hills, and spacious fields. It was taken by the French in 1745, and retaken by the king of Sardinia in 1746. E. Long. 8. 15. N. Lat. 54. 50.

ASTIGI, indeclinable; a colony, and conventus juridicus, of Bætica, surnamed *Augusta Firma*, situated on the Singulus, which falls into the Bætis; called also *Collonia Affigitana*, (Pliny); now *Ecija*, midway between Seville and Corduba. W. Long. 5°. Lat. 37. 20.

ASTOMI, in anthropology, people feigned without mouths. Pliny speaks of a nation of Astomi in India, who lived only by the smell or effluvia of bodies, taken in by the nose.

ASTORGA, a very ancient city of Spain, in the kingdom of Leon, with a bishop's see, is seated on the river Tuerta, and well fortified both by art and nature. It stands in a most agreeable plain, about 150 miles north-west of Madrid. There are excellent trouts in the river. W. Long. 6. 20. N. Lat. 42. 20.

ASTRACAN, a province of Russia, and the most easterly part of Europe, bounded on the north by Bulgaria and Balcitra; on the south, by the Caspian Sea; on the west by the Volga, which divides it from the Nagayan Tartars and Don Cossacks; and on the east, by the great ridge of mountains which part it from Great Tartary. The province extends from the 46th to the 52^d degree of latitude. The summer is long, and

intensely hot: the winter continues about three months so severe, that the Volga is frozen hard enough to bear loaded sledges. The soil is rich and fertile; but the Tartars who inhabit it are strangers to agriculture. On the western and southern sides of the Volga are heaths of a prodigious extent, sandy, desert, and uncultivated: these, however, produce vast quantities of fine transparent salt in pits, where the sun bakes and incrustates it to the thickness of an inch on the surface of the water. There are pits in the neighbourhood of Astracan which yield this excellent salt in such abundance, that any person may carry it off, paying at the rate of one farthing a pook, which is equal to forty pounds. The metropolis, Astracan, is situated within the boundaries of Asia, on an island called *Dolgoi*, about 60 English miles above the place where the Volga disemboques itself into the Caspian Sea. The city derives its name from Hædjee Tarken, a Tartar, by whom it was founded. It was conquered by Iwan Basilowitz, recovered by the Tartars in the year 1668, and retaken by the Czar, who employed for this purpose a great number of flat-bottomed vessels, in which he transported his forces down the Volga from Casan.

The city of Astracan is about two miles and a half in circumference, surrounded by a brick-wall, which is now in a ruinous condition: but, if we comprehend the suburbs, the circuit will be near five miles. The number of inhabitants amounts to 70,000, including Armenians and Tartars, as well as a few Persians and Indians. The garrison consists of six regiments of the best Russian troops, who, when this place was alarmed from the side of Persia, had in the adjacent plain erected a great number of small batteries, to scour the fields, and obstruct the approach of the enemy. The houses of Astracan are built of wood, and generally mean and inconvenient. The higher parts of the city command a prospect of the Volga, which is here about three miles in breadth, and exhibits a noble appearance. The marshy lands on the banks of it render the place very sickly in the summer: the earth, being impregnated with salt, is extremely fertile, and produces abundance of fruit, the immoderate use of which is attended with epidemical distempers. Sickness is likewise the consequence of those annual changes in the atmosphere produced by the floods in spring and autumn. All round the city of Astracan, at the distance of two miles, are seen a great number of gardens, orchards, and vineyards, producing all sorts of herbs and roots, (except cauliflowers). The grapes are counted so delicious, that they are preferred in sand, and transported to court by land-carriage at a prodigious expence: yet the wine of Astracan is very indifferent. The summer being generally dry, the inhabitants water their gardens by means of large wheels worked by wind or horses, which raise the water to the highest part of the garden, from whence it runs in trenches to refresh the roots of every single tree and plant. The neighbouring country produces hares and partridges, plenty of quails in summer, with wild and water fowl of all sorts in abundance.

About ten miles below Astracan is a small island, called *Bosmaïse*, on which are built large storehouses for the salt, which is made about twelve miles to the eastward, and, being brought hither in boats, is conveyed up the Volga, in order to supply the country

* See *Asteria*.
† See *Asteria*.

* See *Asteria* and *Star-stone*.

country as far as Moscow and Twere. The quantity of falt annually dug for thefe purpofes amounts to fome millions of pounds, the exclusive property of which is claimed by the crown, and yields a confiderable revenue; for the foldiers and bulk of the people live almoft entirely on bread and falt. The neighbourhood of thefe falt-works is of great advantage to the fisheries, which extend from hence to the Cafpian Sea, and reach to the fourth-eaft as far as Yack, and even 100 miles above Zaritzin. The principal fish here caught are fturgeon, ftarlet, belluga, and afotra. Thefe, being falted, are put on board of vefels, and fent away in the fpring, for the ufe of the whole empire, even as far as Peterfburg: but as fish may be kept fresh as long as it is frozen, the winter is no fooner fet in, than they tranfport great quantities of it by land through all the provinces of Ruffia. Of the roes of the fish called *belluga*, which are white, transparent, and of an agreeable flavour, the fishers here prepare the caviare, which is in fo much efteem all over Europe. Thefe fisheries were first eftablifhed by one Tikon Demedoff, a carrier, who fettled in this place about half a century ago, his whole wealth confifting of two horfes. By dint of fkill and induftry, he foon grew the richeft merchant in this country: but his fucces became fo alluring to the crown, that of late years it hath engroffed fome of the fisheries as well as the falt-works.

From the latter end of July to the beginning of October, the country about Afracan is frequently infested with myriads of locusts, which darken the air in their progrefion from the north to the fouthward; and, wherever they fall, confume the whole verdure of the earth. Thefe infects can even live for fome time under water: for when the wind blows acrofs the Volga, vast numbers of them fall in clutters, and are rolled afhore; and their wings are no fooner dry, than they rife and take flight again.

Heretofore the inhabitants of Afracan traded to Kluva and Bokhara; but at prefent thefe branches are loft, and their commerce is limited to Perfia and the dominions of Ruffia. Even the trade to Perfia is much diminished by the troubles of that country: nevertheless, the commerce of Afracan is ftill confiderable. A few years ago, the city maintained about 40 vefels, from 1 to 200 tons burden, for the Cafpian traffick. Some of thefe belong to the government, and are commanded by a commodore, under the direction of the admiralty. This office is generally well ftocked with naval forces, which are fold conveyance to the merchants. The trading fhips convey provisions to the frontier towns of Terkie and Kilif, fituated on the Cafpian Sea; and tranfport merchandize to feveral parts of Perfia. Some years ago, the Englifh Ruffian company opened a trade from Afracan to Perfia over the Cafpian Sea, and fhips were built for that purpofe; but this commerce was foon prohibited by the Czarina, in confequence of the mifmanagement of an Englifh factor, and the jealoufy of the Ruffians. The merchants of Afracan export to Perfia, chiefly on account of the Armenians, red leather, linens, woollen cloths, and other European manufactures. In return, they import the commodities of Perfia, particularly thofe manufactured at Cafan; fuch as silk falfes intermixed with gold, for the ufe of the Poles; wrought filks and ftuffs mixed with cotton; rice, cotton, rhubarb, and a fmall quantity of other drugs; but

the chief commodity is raw filk. The government has engroffed the article of rhubarb, the greater part of which is brought into Ruffia by the Tartars of Yakutski, bordering on the eaftern Tartars belonging to China. They travel through Siberia to Samura, thence to Cafan, and laftly to Moifcow. The revenue of Afracan is computed at 150,000 rubles, or 33,000 pounds, arifing chiefly from falt and fish. The city is ruled by a governor, under the check of a chancery. He is nevertheless arbitrary enough, and exercises oppreffion with impunity. The officers of the admiralty and cuftom-houfe, having very fmall falaries, are open to corruption, and extremely rapacious. At chriftening-fefts, which are attended with great intemperance, the guefts drink a kind of cherry-brandy out of large goblets; and every perfon invited throws a prefent of money into the bed of the mother, who fits up with great formality to be faluted by the company.

The Indians have a Pagan temple at Afracan, in which they pay their adoration, and make offerings of fruit to a very ugly deformed idol. The priefts of this pagod ufe incenfe, beads, cups, and profltrations. The Tartars, on the contrary, hold idol-worship in the utmoft abomination.

ASTRAGAL, in architecture, a little round moulding, which in the orders furrounds the top of the shaft or body of the column. It is alfo called the *talon* and *tondino*; it is ufed at the bottoms as well as tops of columns, and on other occafions: it properly represents a ring, on whatever part of a column it is placed; and the original idea of it was that of a circle of iron put round the trunk of a tree, ufed to fupport an edifice to prevent its fplitting. See Plate XXIX. fig. 2. The *astragal* is often cut into beads and berries, and is ufed in the ornamented entablatures to feparate the feveral faces of the architrave.

ASTRAGAL, in gunnery, a round moulding encom- paffing a cannon, about half a foot from its mouth.

ASTRAGALUS, MILK-VETCH, or LIQUORICE-VETCH; a genus of the decandria order, belonging to the diadelphia clafs of plants. Of this genus there are 39 fpecies; but none of them feem to deferve particular notice, except the common fort, which grows wild upon dry uncultivated places, and is recommended by Mr Anderfon to be cultivated as proper food for cattle. See AGRICULTURE, n° 58.

ASTRAGALUS, in anatomy. See there, n° 64.

ASTRANTIA, MASTERWORT; a genus of the digynia order, belonging to the pentandria clafs of plants, of which there are three fpecies; but as they are only preferved in botanic gardens for the fake of variety, we omit any particular defcription of them.

ASTRÆA, in aftronomy, a name which fome give to the fign Virgo, by others called *Erigone*, and fometimes *Ifis*. The poets feign that juftice quitted heaven to refide on earth, in the golden age; but, grown weary of the iniquities of mankind, the left the earth, and returned to heaven, where the commenced a conftellation of ftars, and from her orb ftill looks down on the ways of men.

ASTRICTION, in law. See THIRLAGE.

ASTRICTION, among phyficians, denotes the operation of aftringent medicines.

ASTRINGENTS, in the MATERIA MEDICA. See there, n° 36, &c.

ASTROGNOSIA,

Afracan

Afringent

ASTROGNOSIA
||
Astronomical.

ASTROGNOSIA, the science of the fixed stars, or the knowledge of their names, constellations, magnitudes, &c. See ASTRONOMY.

ASTROITES, or STAR-STONE, in natural history. See the articles ASTERIA and STAR-STONE; and Plate XLII. fig. 7.

ASTROLABE, the name for a stereographic projection of the sphere, either upon the plane of the equator, the eye being supposed to be in the pole of the world; or upon the plane of the meridian, when the eye is supposed in the point of the intersection of the equinoctial and horizon.

ASTROLABE, is also the name of an instrument formerly used for taking the altitude of the sun or stars at sea.

ASTROLABE, among the ancients, was the same as our armillary sphere.

ASTROLOGY, a conjecural science, which teaches to judge of the effects and influences of the stars, and to foretell future events by the situation and different aspects of the heavenly bodies. This science has long ago become a just subject of contempt and ridicule. See DIVINATION, n^o 1.

ASTRONOMICAL, something relating to astronomy.

ASTRONOMICAL Calendar, an instrument engraved on copper plates, printed on paper, and pasted on a board, with a brass slider carrying a hair: it shews by inspection the sun's meridian altitude, right ascension, declination, rising, setting, amplitude, &c. to a greater degree of exactness than the common globes.

ASTRONOMICAL Sector, a very useful mathematical instrument, made by the late ingenious Mr Graham.

It is allowed that a micrometer is the most accurate and convenient instrument for observing the place of a planet or comet, when it happens to be near enough to any known star, by taking the differences of its right ascension and declination from those of the star: but this being frequently impracticable, by reason that many large places in the heavens are void of stars whose places are known, it is necessary to have recourse to moveable quadrants, or sextants, furnished with telescopic sights, for taking larger distances. But besides the difficulty and charge of procuring good instruments of this kind, the great trouble and uncertainties in observing with them are very notorious, arising chiefly from the difficulty the observers find in making their observations and each telescope correspond together at the same instant while the instrument is following the diurnal motion of the heavens. The lovers of astronomy are therefore much obliged to the late ingenious Mr George Graham, F. R. S. not only for many useful improvements in the mechanism of several astronomical instruments, but also for contriving a very commodious and accurate one for the purpose aforesaid; that is, for taking such differences of right ascension and declination as are too large to be observed through a fixed telescope; and yet with equal facility and exactness too in proportion to the radius of the instrument.

Let A B represent an arch of a circle, containing ten or twelve degrees well divided, having a strong plate C D for its radius, fixed to the middle of the arch at D: let this radius be applied to the side of an axis H F I, and be moveable about a joint fixed to it

Astronomical.

at F, so that the plane of the sector may be always parallel to the axis H I; which being parallel to the axis of the earth, the plane of the sector will always be parallel to the plane of some hour-circle. Let a telescope C E be moveable about the centre C of the arch A B, from one end of it to the other, by turning a screw at G; and let the line of sight be parallel to the plane of the sector. Now, by turning the whole instrument about the axis H I, till the plane of it be successively directed, first to one of the stars, and then to another, it is easy to move the sector about the joint F, into such a position, that the arch A B, when fixed, shall take in both the stars in their passage, by the plane of it, provided the difference of their declinations does not exceed the arch A B. Then, having fixed the plane of the sector a little to the westward of both the stars, move the telescope C E by the screw G; and observe by a clock the time of each transit over the cross-hairs, and also the degrees and minutes upon the arch A B, cut by the index at each transit; then, in the difference of the arches, the difference of the declinations, and by the difference of the times, we have the difference of the right ascensions of the stars.

The dimensions of this instrument are these: the length of the telescope, or the radius of the sector, is $2\frac{1}{2}$ feet; the breadth of the radius, near the end C, is $1\frac{1}{2}$ inch; and at the end D two inches. The breadth of the limb A B is $1\frac{1}{2}$ inch; and its length six inches, containing ten degrees divided into quarters, and numbered from either end to the other. The telescope carries a nonius or subdividing plate, whose length, being equal to sixteen quarters of a degree, is divided into fifteen equal parts; which, in effect, divides the limb into minutes, and, by estimation, into smaller parts. The length of the square axis H F I is eighteen inches, and of the part H I twelve inches; and its thickness is about a quarter of an inch: the diameters of the circles are each five inches: the thickness of the plates, and the other measures, may be taken at the direction of a workman.

This instrument may be rectified, for making observations, in this manner: By placing the intersection of the cross-hairs at the same distance from the plane of the sector, as the centre of the object-glass, the plane described by the line of sight, during the circular motion of the telescope upon the limb, will be sufficiently true, or free from conical curvature; which may be examined by suspending a long plumb-line at a convenient distance from the instrument; and by fixing the plane of the sector in a vertical position, and then by observing, while the telescope is moved by the screw along the limb, whether the cross hairs appear to move along the plumb-line.

The axis h f o may be elevated nearly parallel to the axis of the earth, by means of a small common quadrant; and its error may be corrected, by making the line of sight follow the circular motion of any of the circumpolar stars, while the whole instrument is moved about its axis h f o, the telescope being fixed to the limb: for this purpose, let the telescope k l be directed to the star a, when it passes over the highest point of its diurnal circle, and let the division cut by the nonius be then noted: then, after twelve hours, when the star comes to the lowest point of its circle, having turned the instrument half round its axis, to bring the telescope

telescope into the position mn ; if the cross hairs cover the same star supposed at b , the elevation of the axis bfo is exactly right; but if it be necessary to move the telescope into the position uv , in order to point to this star at c , the arch mu , which measures the angle mfu or bfc , will be known; and then the axis bfo must be depressed half the quantity of this given angle if the star passed below b , or must be raised so much higher if above it; and then the trial must be repeated till the true elevation of the axis be obtained. By making the like observations upon the same star on each side the pole, in the six-o'clock-hour-circle, the

error of the axis, toward the east or west, may also be found and corrected, till the cross-hairs follow the star quite round the pole: for supposing $apbc$ to be an arch of the meridian (or in the second practice of the six-o'clock hour-circle), make the angle afp equal to half the angle afc , and the line fp will point to the pole; and the angle ofp , which is the error of the axis, will be equal to half the angle bfc or mfu , found by the observation; because the difference of the two angles afb , afc , is double the difference of their halves afp and afp . Unless the star be very near the pole, allowance must be made for refractions.

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